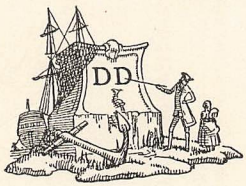

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# FRANCIS BACON

THE GREAT INSTAURATION:
PROŒMIUM, PREFACE, PLAN OF THE WORK,
AND NOVUM ORGANUM

# THOMAS HOBBES

LEVIATHAN

# JOHN LOCKE

AN ESSAY CONCERNING HUMAN
UNDERSTANDING

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FIRST EDITION

# PREFACE

The selections from the writings of Bacon which appear in this volume are taken from the edition of his *Works* by Spedding, Ellis and Heath, London, 1858; the selections from Hobbes' *Leviathan* are from the Molesworth edition, London, 1841; and those from Locke's *Essay* are from the edition by J. A. St. John, London, 1854. Brackets, following A. C. Fraser's edition of the *Essay,* are used to indicate amendments made by Locke in the second, third and fourth editions published during his life. In some cases, the section titles in Fraser's edition have been substituted for those in St. John. Omissions are shown by dots, and, in the case of entire chapters or sections, are also indicated by the Table of Contents. Footnotes placed in brackets are by the editor.

In each instance of an important omission I have endeavored to preserve the continuity of the argument, despite the brevity of these selections, by appending a note indicating or summarizing the omitted material. In the interest of accuracy, and to prevent the intrusion of an alien idiom, I have tried to make the summaries, as far as possible, by means of quotation rather than paraphrase.

Dr. Philip Wheelwright, editor of the series in which this volume appears, has given me valuable suggestions and criticisms.

G. K.

of trade and plantations, an office which he held from 1696 to 1700.

Locke was fifty-seven years old when he returned to England in 1689 and, except for the articles contributed to the *Bibliothèque Universelle,* he had published nothing. Now he released in rapid succession a whole series of works for the press, the greater number of which appeared anonymously. The first of these, his *Epistola de Tolerantia,* appeared in Holland in 1689 and a little later in the same year in an English translation by William Popple. Controversies over this work occasioned a *Second Letter* and a *Third Letter* in 1690 and 1692 respectively. In 1690 Locke also published 90 his *Two Treatises of Government,* and *The Essay Concerning Human Understanding.* All of these works, and particularly the *Essay,* had an immediate success.

In 1691 Locke, who had weak lungs and was a chronic sufferer from asthma, felt that he could no longer endure the smoky atmosphere of London, and retired from the city to live at Oates in the family of his close friends Sir Francis and Lady Masham. Here he spent an idyllic old age, engaged in study and writing, receiving the visits of distinguished friends and admirers, such as Newton and Molyneux, and occasionally paying visits to London. In these last fourteen years he several times enlarged and revised the *Essay,* in successive editions—especially the second edition of 1694 and the fourth of 1700—replied to some of his many critics, notably to Edward Stillingfleet, Bishop of Worcester, who charged that the "new way of ideas" would subvert faith and morals, and composed a number of other minor works dealing with economic, philosophical, and religious questions. He died at the age of seventy-two, at Oates.

We have seen that the *Essay* originated in the difficulties that Locke and his friends fell into when discussing "the principles of morality and revealed religion." Locke then hit upon the idea that before such questions could be profitably treated it was necessary first "to examine our own abilities, and see what *objects* our understandings were, or were last, in a retirement where an attendance on my health gave me leisure, it was brought into that order thou now seest it."[1] In the composition of the work Locke almost wholly ignored, with the exception of Descartes, the views of other writers, being resolved "to examine humane understanding, and the ways of knowledge, not by others' opinions, but by what I could from my own observations collect myself."[2]

In 1675 Shaftesbury fell from power and Locke was set free to retire to France in search of health. There he resided nearly four years, for the most part at Montpellier. During these years he made a good deal of progress with the *Essay,* but he "thought too well of it to let it then go out of his hands," and it was another decade before he at last had it ready for publication.

Locke returned to London, and to Shaftesbury's service, in 1679. He spent the next four years in the midst of a turmoil of intrigues and plots. Shaftesbury, after again enjoying power for a short while, espoused the cause of the pretender Monmouth, and, after the arrest of Monmouth, was forced to flee to Holland, where he died in 1682. Locke's close connection with Shaftesbury brought him under suspicion. Fearful of his safety he also sought refuge in Holland. In his exile he formed particular friendships with the liberal theologian, Limborch, and with Le Clerc, editor of the *Bibliothèque Universelle,* the chief literary and critical journal of its time in Europe. Locke contributed several articles to this journal, the last of them being an epitome in French of the *Essay.*

The Glorious Revolution of 1688 reversed Locke's fortunes. He returned to England in the fleet that brought over the Princess of Orange. The new government offered him various posts, several of which he declined because of weak health, and that he might have leisure for study and writing. But he did accept certain positions which would not take up all of his time, the most important being that of commissioner

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[1] *Essay,* Epistle to the Reader.

[2] B. Rand, *The Correspondence of John Locke and Edward Clarke* (1927), pp. 28–29.

THE DOUBLEDAY-DORAN SERIES IN PHILOSOPHY

PHILIP WHEELWRIGHT, PH.D.
*General Editor*

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# INTRODUCTION

The seventeenth century was the focal period, in Western Europe, of that vast slow revolution in the climate of opinion which constitutes the shift from medieval culture to our modern age. During the two previous centuries the great medieval synthesis had been slowly breaking down: the feudal order was being supplanted by new national states, for the most part under strongly centralized monarchies; the guild system was being undermined by the growth of rapidly expanding commercial, industrial, and colonial enterprise; the manorial system of agriculture was giving way to individual farming, carried on by a class of peasant proprietors or independent yeomen; Catholic 'Christendom' was splitting up into a host of rival sects and 'churches'; there was a revival of interest in Greek and Roman art and literature, with a concomitant growth of naturalism and humanism in the arts, and a rapid development of national literatures written in the vernacular; and, finally, philosophy, emancipating itself from the domination of tradition and ecclesiastical authority, was laying the foundations for the development of modern science, thus precipitating the greatest revolution in thought and practice in the history of mankind.

During the fourteenth and fifteenth centuries men's energies were largely absorbed in the negative task of criticism and revolt, in freeing themselves from medieval ideas and institutions. But by the seventeenth century the need for a constructive synthesis had become imperative. The response to this social need was a great efflorescence of creative genius, expressing itself in the arts, in science, and in philosophy. Philosophy was confronted with fundamental problems produced by that totally new conception of the nature of the world which was emerging from the development of modern science. A new theory of method, and a new cosmology which would square with the practice and results of modern science, and the application of this new method to questions of morals, politics, and religion had to be worked out. The result was a series of great philosophical systems, paralleling and interpreting the scientific movement. Beside the names of Kepler, Galileo, Huygens, Harvey, Boyle, and Newton we can set those of Bacon, Descartes, Hobbes, Spinoza, Locke, and Leibniz. Descartes, Spinoza, and Leibniz formulated comprehensive rationalist systems; Bacon, Hobbes, and Locke laid the foundations of modern empiricism. Together these thinkers set the problems and determined the general trend for the whole subsequent development of modern philosophy.

## FRANCIS BACON

Francis Bacon (1561–1626) was the youngest son of Sir Nicholas Bacon, Lord Keeper of the Great Seal under Elizabeth. Little is known of his early life. At thirteen he was sent to Trinity College, Cambridge, where he acquired a strong dislike of the decadent scholasticism at that time professed in the Universities. Destined for a career in the public service, he was sent to France, when sixteen years of age, in the suite of Sir Amyas Paulet, the ambassador, to acquire a knowledge at first hand of politics and diplomacy. Here he remained until 1579, when the sudden death of his father ruined all his expectations and left him, without means or influence, to make a way for himself at court. Bacon turned to the study of law, hoping by this avenue eventually to attain some important office in the government. He became a barrister and entered Parliament, where he quickly achieved a leading position.

Meanwhile Bacon was also carrying on his philosophical studies. He had an extraordinary capacity for uniting intellectual pursuits with practical activity. Throughout his career there runs a clear duality of interest. In one of the many letters to his powerful uncle, Lord Burghley, canvasing for some preferment at court, he says, "Lastly, I confess that I have as vast contemplative ends, as I have moderate civil ends; for I have taken all knowledge to be my province; and if I could purge it of two sorts of rovers, whereof the one with frivolous disputations, confutations, and verbosities, the other with blind experiments and auricular traditions and impostures, hath committed so many spoils, I hope I should bring in industrious observations, grounded conclusions, and profitable inventions and discoveries; the best state of that province."[1] Throughout a life preoccupied with legal and political business Bacon persistently worked toward the realization of this great intellectual project.

Under Elizabeth, Bacon's efforts to establish himself in office met with continual frustration. Although he was appointed one of the Queen's Council and his legal abilities were made use of, he never received an office that carried with it financial gain, or important responsibilities. His only reward was the reversion of an office in the Star Chamber for which he had to wait a full twenty years. With the accession of James matters mended. He was made Solicitor-General in 1607, Attorney-General in 1613, Privy Councillor in 1616, Lord Keeper in 1617 and Lord Chancellor in 1618. In that year he was created Baron Verulam, and in 1621 Viscount St. Albans.

During these crowded years Bacon had not allowed his intellectual interests to lapse. In 1597 he published the first edition of his *Essays.* This little book, a minor classic of English literature, he enlarged and amended in the subsequent editions of 1612 and 1625. In the *Essays* Bacon condensed in pregnant aphorisms his shrewd, coolly detached, and realistic reflections on men and their manners. In 1605 he published his first philosophical work, *The Twoo Bookes of Francis Bacon on the Proficience and Advancement of Learning Divine and Humane.* The book was addressed to the King in the hope of enlisting the royal patronage for his ambitious project of a *Great Instauration* or *Renovation of the Sciences.* It presents the first part of the total plan, a comprehensive classification and inventory of the existing sciences which would indicate their deficiencies and suggest means for their renovation. Then, in 1620, he brought out his greatest work, the *Novum Organum, sive Indicia Vera de interpretatione naturae.* This book, the second part of the project, is an exposition of the new method, by which arts and sciences will be created to attain a command over nature hitherto unknown.

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[1] J. Spedding, *Life and Letters,* Vol. 1, pp. 108–109.

Bacon was now (1620) at the height of his career. He had attained the highest public office to which he might aspire and he had made substantial progress in the realization of his ambitious intellectual program. Then came his sudden and totally unexpected fall. Charges of bribery and corruption in the exercise of his judicial office were preferred against him in the Commons under the instigation of Coke and other enemies who were eager to topple him from his eminence. The case was sent to the House of Lords for trial. Bacon made his submission and was convicted, though it was not shown that the 'presents' which he had received from suitors had in any way affected his judgments. Bacon himself expressed the essential truth of the affair: "I was the justest judge that was in England these fifty years, but it was the justest judgment that was in Parliament these two hundred years."

Expelled from public life, Bacon, like Cicero, turned to the consolations of literature and philosophy. During the last five years of his life he composed his *History of Henry the VII,* a masterpiece of historical writing, made an extended Latin translation of the *Advancement of Learning* as the *De Augmentis Scientiarum,* and composed a number of fragments intended for the latter parts of his *Great Instauration.*

In a fragment, written probably about 1603, the *De interpretatione naturae procemium,* Bacon sets forth his qualifications for the accomplishment of his great project: "I found that I was fitted for nothing so well as for the study of Truth; as having a mind nimble and versatile enough to catch the resemblances of things (which is the chief point), and at the same time steady enough to fix and distinguish their subtler differences; as being gifted by nature with desire to seek, patience to doubt, fondness to meditate, slowness to assert, readiness to consider, carefulness to dispose and set in order; and as being a man that neither affects what is new nor admits what is old, and that hates every kind of imposture. So I thought my nature had a kind of familiarity and relationship with Truth."[1]

The *Great Instauration,* as Bacon planned it, falls into six parts: The first was to be a comprehensive division and analysis of the existing sciences, so worked out as to point the way to the discovery of new knowledge. This part is fulfilled by the *De Augmentis.* The second was to point out the defects of the existing methods in the sciences and to give a full description and detailed illustration of the new method, by means of which one might effect "a total reconstruction of sciences, arts, and all human knowledge, raised upon the proper foundations."[2] This exposition of the new method is partially accomplished in the *Novum Organum.* The third was to consist of a new kind of natural history: *The Phenomena of the Universe, or a Natural and Experimental History for the foundation of philosophy.* This was to be a collection of data drawn from observation and experiment which would serve as the materials from which, by the new method of induction, laws might be derived. Only a beginning exists, a *Historia Ventorum, Historia Vitae et Mortis* and fragments of several other histories. The fourth was to consist of a number of completed examples of the method, so selected as to serve for models in all the various fields of inquiry. This part Bacon called *The Ladder of the Intellect.* Only the preface for it was written. The fifth was to be the

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[1] *Works,* iii, p. 520. Here quoted from W. R. Sorley: "History of English Philosophy" (1920), pp. 18–19.

[2] *Works,* viii, p. 18.

*Forerunners, or Anticipations of the New Philosophy.* This was to consist of the tentative and partial results of the new method so far as Bacon had been able at the time to arrive at them. The incomplete investigation of the phenomena of heat, used to illustrate his method in the second part of the *Novum Organum,* is probably an instance of what Bacon had in mind for this collection of *Anticipations.* Only a preface exists. The sixth and last part Bacon called *The New Philosophy, or Active Science.* It was to consist of the completed system of sciences firmly based on the organized data of Part III and constructed by the methods of Part II. Here again a preface is extant, but the accomplishment of this final work is to be left to posterity.

When we survey Bacon's scheme as a whole, it seems to us today singularly pretentious and unreal, a half completed monument to the ambition and vainglory, the high imagination and inveterate optimism, of his age. Certainly he merited Harvey's jibe that he wrote philosophy like a lord chancellor. Bacon's conception of the methods of science is a curious mixture of crudity and insight. He had very little practical sense as to how scientific observation and experimentation are actually carried on. His own attempts at concrete scientific research were generally inept and ill-conceived. And he uniformly failed to recognize the significance of the actual scientific work accomplished by such men as Copernicus, Kepler, Galileo, Gilbert, and Harvey. He condemned the work of Copernicus as that of a man "who thinks nothing of introducing fictions of any kind into nature, provided his calculations turn out well"; whereas Gilbert's researches on magnetism were equally damned for relying exclusively on the use of experiment. One man was in Bacon's language a 'rationalist,' the other a mere 'empiricist'.[1] Bacon thought that his method would reduce scientific research to a purely routine procedure of collecting facts and generalizing from them, thus putting all minds, as it were, on a level; and he believed that by the institution of a properly organized corps of research workers his natural history of the *Phenomena of the Universe* might be completed in a few years and the whole task of science finished in a generation.[1] His fear of 'anticipations' of nature led him to misunderstand the vital role that hypothesis plays in scientific enquiry, and while he points out the importance of mathematics as a method of exact measurement,[2] his own ignorance of the subject prevented him from perceiving that the basic function of mathematics in science is its use as an instrument for the development of hypothesis.

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[1] *Cf. Novum Organum,* Aph. LXII–LXXI.

These are the crudities and defects in Bacon's philosophy of science. They are due to the circumstance that he was a pioneer in the field, writing at the very beginning of the scientific movement, and to his own amateurishness in the actual practice of scientific research. But his merits are equally real. His discussion of the four *Idols,* of the *Tribe,* of the *Cave,* of the *Market Place* and of the *Theatre,* constitutes a profound analysis of those sources of error and prejudice that, unless precautions are taken against them, will vitiate all enquiry. He accurately defined the objective of scientific knowledge (although the method he devised was inadequate) to be the discovery of 'forms' in nature. By 'forms' he meant "those laws and determinations of absolute actuality, which govern and constitute any simple nature, as heat, light, weight, in every kind of matter and subject that is susceptible of them. Thus the Form of Heat or the Form of Light is the same thing as the Law of Heat or the Law of Light." Knowing the 'form' of a given quality or nature the means now lies within our power to produce that nature. "On a given body to generate and superinduce a new nature or new natures, is the work and aim of Human Power. Of a given nature to discover the form, . . . is the work and aim of Human Knowledge." "From the discovery of Forms therefore results truth in speculation and freedom in operation."[3]

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[1] *Works,* viii, p. 355.

[2] *Works,* viii, p. 365, and *Novum Organum,* Part II, Aph. VIII.

[3] *Novum Organum,* Part II, Aph. XVII, I, III.

Finally, he was the most clairvoyant and eloquent prophet, in that age, of the material and moral consequences of the new scientific movement. Bacon believed that he saw the means of inaugurating a greater socialization of human life, and he described it poetically in his *New Atlantis,* practically in his life work, *The Great Instauration.* It was an old truth that men will band in packs to hunt a common quarry, and he saw a new means of utilizing it. Let men know that by co-operative effort they can subdue the forces of nature to their desires and create abundance, then, being no longer rivals, they may live in amity and understanding. That, Bacon clearly saw, was the true import of the new science: "the knowledge of causes, and the secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible."[1]

## THOMAS HOBBES

Thomas Hobbes (1588–1679) was the second son of a country vicar who "was one of the ignorant Sr. Johns of Q. Elizabeth's time, could only read the prayers of the church, and the homilies; and valued not learning, as not knowing the sweetness of it."[2] An uncle, a well-to-do tradesman, provided for Hobbes' education. Hobbes proved such a good scholar "that before he went to the University, he had turned Euripidis Medea out of Greeke into Latin Iambiques, which he presented to his master."[3] At fourteen he entered Oxford. Here he conceived the same distaste that Bacon had contracted at Cambridge for the scholastic fare offered. "He did not much care for logick, yet he learned it, and thought himself a good disputant."[4] His chief recreations were to snare jackdaws and to visit bookshops where he would "lye gaping on mappes."

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[1] *New Atlantis,* World's Classics ed., p. 265.

[2] Aubrey's *Life of Hobbes:* here cited from the reprint in F. J. E. Woodbridge, "The Philosophy of Hobbes" (1903), p. ix.

[3] *Ibid.,* p. xi.

[4] *Ibid.,* p. xii.

On leaving the University Hobbes became tutor and companion to the son of Lord Cavendish, afterwards the first Earl of Devonshire. This connection with the Cavendish family was to endure, with some interruptions, for the rest of his life. With his pupil Hobbes made the grand tour in 1610, visiting France, Germany, and Italy. On their return Hobbes continued as secretary to the young lord. The duties were light and Hobbes devoted himself to classical studies. He made a translation of Thucydides, published in 1628. It was also during this period that Hobbes served Bacon occasionally as an amanuensis, and translated some of Bacon's essays into Latin. But at the time Hobbes' interest in philosophy had not awakened, and there is no trace of Bacon's influence in his subsequent writings.

In 1628 Hobbes' friend and patron, the second Earl, died. Hobbes then became tutor to the son of Sir Gervase Clifton with whom he made a second tour of the continent. But in 1631 Hobbes was recalled to England to take charge of the education of the third Earl of Devonshire, his former patron's son. It was somewhere about this time that two significant incidents occurred which started Hobbes on his philosophical career. The first is recounted by Aubrey: "He was forty yeares old before he looked on geometry, w'ch happened accidentally; being in a gentleman's library in . . . Euclid's Elements lay open, and it was the 47 Prop. Lib. I. So he reads the proposition, 'By G—,' says he, 'this is impossible!' So he reads the demonstration of it, w'ch referred him back to another, w'ch he also read, et sic deinceps, that at last he was demonstratively convinced of that truth. This made him in love with geometry."[1]

The second incident was a conversation among learned men at which the question arose, "What is sensation?" Puzzling over this Hobbes came to the conclusion that the only cause of change in all bodies, including organic bodies, is motion, and that therefore sensation must be a mode of motion. There exists a *Short Tract on First Principles,* probably dating about the year 1630, in which Hobbes adopts the geometric order of demonstration as his method, and uses the conception of mechanical causality as his basic principle of explanation.[1] From this time forth his dominant interest lies in the formulation of a comprehensive materialistic system.

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[1] *Ibid.*, p. xiii.

In 1634 Hobbes made a third trip abroad, with the young Earl. By this time he was coming to be known as a philosopher. In Italy he visited Galileo, for whom he had conceived the greatest admiration, and in Paris he became a member of the famous society of philosophers and scientists which had its center in the cell of the Abbé Mersenne.

On his return to England in 1637 Hobbes became increasingly preoccupied with the political issues of the time, so that "for ten yeares together his thoughts were much, or almost altogether unhinged from the mathematiques; but chiefly intent on his 'De Cive,' and after that on his 'Leviathan,' w'ch was a great putt-back to his mathematicall improvement."[2] Hobbes clearly foresaw that if the quarrel between King and Parliament continued as it was going it would result in a ruinous civil war. The only remedy for civil disorder, in his opinion, was the persuasion of men to a truly scientific comprehension of the principles of sound government. Hobbes was therefore impelled prematurely to give out his psychology and political philosophy. The first expression of his views on this subject was a little treatise entitled *The Elements of Law* (1640). He says that "of this treatise, though not printed, many gentlemen had copies, which occasioned much talk of the author: and had not his majesty dissolved the parliament, it had brought him into danger of his life."[3] Frightened, Hobbes fled to the Continent, where he remained for the next eleven years. This period of exile was the most productive of his life. He now had a complete philosophical system. It was his intention to present it in three parts, dealing in due order with physics, psychology, and politics. But the disorders of the time, the country being "boiling hot with questions concerning the rights of dominion, and the obedience due from subjects, the true forerunners of an approaching war," "ripened and plucked" from him the last part first.[1] This was the *De Cive,* a remodelled version of the second half of his unpublished manuscript, the *Elements of Law,* which appeared in 1642. Hobbes also, on Mersenne's invitation, composed his objections to Descartes' *Meditationes,* at that time being circulated in manuscript. These appeared, together with Descartes' replies, as the third set of objections when the book was published. But most notably this was the time in which he wrote *Leviathan.* Aubrey has given us an account of Hobbes' method in composing his masterpiece: "the manner of writing of which booke was thus. He walked much and contemplated, and he had in the head of his cane a pen and ink-horne, carried always a note-booke in his pocket, and as soon as a thought darted, he presently entered it into his booke, or otherwise might have lost it. He had drawne the designe of the booke into chapters, &c. he knew whereabouts it would come in. Thus that booke was made."[2]

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[1] *Cf.* Hobbes, *Elements of Law,* ed. Tönnies (1889), pp. 193–210.

[2] Aubrey, *loc. cit.,* p. xiv.

[3] *English Works,* iv, p. 414.

Through the influence of the Cavendish family Hobbes was appointed mathematical tutor to the young Prince of Wales. But the publication of *Leviathan* in 1651 aroused much resentment in the exiled court. The royalists disliked Hobbes' doctrine, despite his defense of absolute sovereignty, because it entirely put aside any notion of divine right and explicitly advised submission to a *de facto* government; and the exiled clergy were equally antagonized by his heterodox attempt completely to subordinate church to state. Hobbes therefore began to think of returning to England. At the end of 1651 he made his submission to the Council of State and went home.

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[1] *Ibid.*, ii, p. xx.

[2] Aubrey, *loc. cit.*, p. xv.

Hobbes now devoted himself to the completion of his system. The first part, *De Corpore,* appeared in 1655 and the second, *De Homine,* in 1658. His life task was completed, but the old man, (he was now sixty-nine) still had some twenty-three years of incessant activity before him. Most of his energy during these years was wasted in attempting to breast the storm of controversy that his works aroused. In one of these controversies, with Bishop Bramhall over the freedom of the will, he acquitted himself notably, but in another encounter he was not so fortunate. Hobbes, who had come late to mathematics and was self-trained in the subject, fell into the conceit that he at last had squared the circle. This claim was demolished by the Savilian professors of mathematics at Oxford, Seth Ward and John Wallis. But the more Hobbes was proved wrong, the more obstinately he renewed the fight, countering pamphlet with pamphlet until he was ninety years old. During these latter years the indefatigable old man found time to compose a number of other books and tracts, among them his *Behemoth: the History of the Causes of the Civil Wars of England.* In his extreme old age he reverted to his original interest in the classics, translating both the *Iliad* and the *Odyssey* into rhymed quatrains, and amusing himself by writing his autobiography in Latin verse. In 1675 he retired from London to the seat of the Cavendish family in Hardwick. There he died in 1679.

Hobbes' philosophy is the most thoroughgoing attempt in the century to generalize the mechanical viewpoint of the new science and to apply it without restriction to everything in nature. Descartes, his great contemporary, starting out with the same general intention, compromised with tradition by bifurcating nature into the two isolate realms of *res extensa* and *res cogitans,* thus putting a barrier up against the intrusion of the new scientific method into the field of the specifically human. Hobbes, on the contrary, contends that a *res cogitans,* a non-material substance, is a contradiction in terms, whatever exists must be a material body in motion, and the only mode of explanation is in terms of efficient or mechanical causality.

He is therefore committed to the attempt to show how man himself and human institutions can also be explained in terms of Galileo's new science of motion. Hobbes thought of himself as doing for psychology and politics what Galileo had done for physics, sweeping away tradition and establishing these sciences on a new foundation. Thus he was the first philosopher to assert and apply the thesis of 'physicalism,' that all of our knowledge, whatever, of events in nature can (theoretically) be stated in terms of the language of the physical sciences.[1] This meant, for Hobbes, that the explanation of every matter of fact must be in terms of mechanical causation. Accordingly, he defines philosophy as "the knowledge acquired by reasoning, from the manner of the generation of any thing, to the properties: or from the properties, to some possible way of generation of the same; to the end to be able to produce, as far as matter, and human force permit, such effects, as human life requireth . . . By which definition it is evident, that we are not to account as any part thereof, that original knowledge called experience, in which consisteth prudence: because it is not attained by reasoning, but found as well in brute beasts, as in man; and is but a memory of successions of events in times past, wherein the omission of every little circumstance altering the effect, frustrateth the expectation of the most prudent: whereas nothing is produced by reasoning aright, but general, eternal, and immutable truth."[2]

This knowledge we get, not by observation and experiment, as Bacon thought, "since experience concludeth nothing universally," but by extending the method of geometry and by proceeding from axioms and definitions to the deduction of ulterior propositions. Hobbes is here again following Galileo in setting forth this ideal of a systematic mathematical formulation and development of all scientific knowledge. The outlines of such a completed system he attempted in his three Latin treatises, *De Corpore* (1655), *De Homine* (1658), *De Cive* (1642).

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[1] A distinguished group of contemporary philosophers, the 'logical positivists,' are today attempting to corroborate this thesis in detail. For a brief statement of their position see R. Carnap, *Philosophy and Logical Syntax* (1935).

[2] *Leviathan,* ch. XLVI.

Hobbes' physics is of merely historical interest, but in his logic, psychology, and politics he made contributions of permanent importance. Logic, in consonance with the mathematico-mechanical ideal which dominates all of his thinking, he defines as what we would today call general semantics, the science of operating with signs. These signs, generally words, are marks arbitrarily assigned to denote our thoughts. Reason, dealing with these marks or signs, can perform various operations upon them; these are always of the nature of computation: "For REASON, in this sense, is nothing but *reckoning,* that is adding and subtracting, of the consequences of general names agreed upon for the *marking* and *signifying* of our thoughts; I say *marking* them when we reckon by ourselves, and *signifying,* when we demonstrate or approve our reckonings to other men."[1] On this basis Hobbes attempts to work out a purely extensional theory which will bring logic into line with mathematics.

In psychology he follows the same mechanistic procedure. All psychological phenomena originate in sense. "The cause of sense, is the external body, or object, which presseth the organ proper to each sense, either immediately, as in the taste and touch; or mediately, as in seeing, hearing, and smelling; which pressure, by the mediation of the nerves, and other strings and membranes of the body, continued inwards to the brain and heart, causeth there a resistance, or counterpressure, or endeavor of the heart to deliver itself, which endeavor, because *outward,* seemeth to be some matter without. And this *seeming,* or *fancy,* is that which men call *sense;* and consisteth, as to the eye, in a *light,* or *color figured;* to the ear, in a *sound;* to the nostril, in an *odor;* to the tongue and palate, in a *savor;* and to the rest of the body, in *heat, cold, hardness, softness,* and such other qualities as we discern by *feeling.* All which qualities, called *sensible,* are in the object, that causeth them, but so many several motions of the matter, by which it presseth our organs diversely. Neither in us that are pressed, are they any thing else, but divers motions; for motion produceth nothing but motion . . . So that sense, in all cases, is nothing else but original fancy, caused, as I have said, by the pressure, that is, by the motion, of external things upon our eyes, ears, and other organs thereunto ordained."[1]

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[1] *Op. cit.,* ch. V.

These motions continuing, though with diminished force, within the organism produce imagination which "therefore is nothing *but decaying sense."*[2] Fancies, or imaginations, have a consequence or succession, one to another, of which Hobbes distinguishes two sorts, those which are *"unguided, without design,* and inconstant," and those which are *"regulated* by some desire, and design." The course of the first sort of consequences or train of imaginations can be determined, Hobbes perceived, by what came later to be called the laws of association of ideas, the second by our perception of causal relations. Such perception of consequence Hobbes calls understanding. But what guides and regulates the individual's activities is always some "passionate thought," and the ruling passion in all individuals is "a perpetual and restless desire of power after power, that ceaseth only in death."

Upon this conception of the human individual as essentially selfish, motivated by the desire to attain security for himself and power over others, Hobbes directly bases his political theory. The natural state of man being that of a war of all against all in which men are approximately equal, one's life therein is "solitary, poor, nasty, brutish, and short."

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[1] *Ibid.,* ch. I.

[2] *Ibid.,* ch. II.

In this state each man has a natural right to everything, there can be no security for any man; and, therefore, while reason tells us that it is the fundamental *law* of nature *"to seek peace and follow it,"* yet it is also the sum of the *right* of nature *"by all means we can, to defend ourselves."*[1] While the "laws of nature oblige *in foro interno;* that is to say, they bind to a desire they should take place," they do not, in the state of nature, oblige *"in foro externo;* that is, to the putting them in act," since there exists no power that can enforce them. "For he that should be modest, and tractable, and perform all he promises, in such time, and place, where no man else should do so, should but make himself a prey to others, and procure his own certain ruin, contrary to the ground of all laws of nature, which tend to nature's preservation."[2] The only way out of this impasse is the institution of a neutral power which will force all men equally to obey the law of nature. And the sole means of establishing such a common power is for men "to confer all their power and strength upon one man, or upon one assembly of men, that may reduce all their wills by plurality of voices unto one will . . . This done, the multitude so united in one person, is called a COMMONWEALTH, in Latin CIVITAS. This is the generation of that great LEVIATHAN, or rather to speak more reverently, of that *mortal god,* to which we owe under the *immortal God,* our peace and defense."[3]

Hobbes' thesis, then, is that sovereignty by its very nature must be indivisible and unlimited. The Sovereign is indeed a mortal god. Hobbes was writing at a time when sedition and civil war were commonly defended by appeals to a law of nature, or to an original contract which was supposed to limit the power of the Sovereign.[4] He neatly turns the tables on the proponents of such doctrine by showing that the laws of nature are only binding when they are also the commands of the Sovereign, and that the very nature of the original compact must be such that the Sovereign, not being himself a party to it, has absolute power, and cannot be held to any obligation.

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[1] *Op. cit.,* ch. XIV.

[2] *Ibid.,* ch. XV.

[3] *Ibid.,* ch. XVII.

[4] For example, Milton in a pamphlet, "The Tenure of Kings and Magistrates," argues that Charles I had broken his compact with the people, and thus absolved them from obedience to his commands.

There remains one other excuse for sedition, and in Hobbes' opinion the most important one. In a letter written in 1641 he says "I am sure that experience teaches thus much, that the dispute for [precedence] between the spiritual and the civil power has of late, more than anything in the world, been the cause of civil wars in all places of Christendom."[1] Hobbes deals with this cause at length, devoting the entire last half of the *Leviathan* to proving that, since it is the prerogative of the Sovereign to determine what is right and what is wrong in all matters of conduct having public concern, he must have an unlimited power to regulate and govern all religious bodies within the state.

While much of what Hobbes wrote on politics, and even on psychology, is obviously colored by the political and religious dissensions amid which he lived, yet his intention was to make exact sciences of these subjects, and it was his hope that *Leviathan* might one time or other fall into the hands of a Sovereign who would "convert this truth of speculation into the utility of practice."[2]

But Hobbes' brilliant and often profound, though premature and narrowly conceived, attempt to formulate a complete synthesis of the sciences on the basis of a mechanistic view of nature, while it aroused a storm of protest, exerted but little constructive influence on any of his contemporaries, with the exception of Spinoza. The age was not yet ready for his intransigent naturalism; and it was obvious to his critics that this first attempt at synthesis did not have a basis in experience adequate to sustain it. Hence it was reserved for Descartes and Locke, who endeavored to find some mode of compromise that would 'reconcile' the implications of the new view of nature with traditional moral and religious values, to set the tone for eighteenth century thought. Yet Hobbes' philosophy definitely forecast the ultimate objective of modern empiricism: as the various experimental sciences have progressively disclosed the details of the structure of nature it has become increasingly evident that the primary task of an empirical philosophy is to carry out on a broader and more comprehensive basis the uncompromising naturalistic synthesis that Hobbes first attempted.

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[1] Quoted from G. C. Robertson, *Hobbes*, p. 55.

[2] *Ibid.*, ch. XXXI.

## JOHN LOCKE

John Locke (1632–1704) was the son of a country attorney who commanded a troop of horse in the Parliamentary forces during the civil wars. Locke grew up during these disordered times: "I no sooner perceived myself in the world," he wrote long after, "than I found myself in a storm." But his education was uninterrupted, despite the chaotic condition of the country. He attended Westminster School, and in 1652 entered Christ Church, Oxford. In 1659 he was appointed to a studentship and, later, to a fellowship which he held until deprived of it, in 1684, by Charles II. During most of the first ten years of this period Locke was in residence at Oxford.

As a student at the University Locke felt the same dissatisfaction as Bacon and Hobbes before him with the traditional studies. Le Clerc, his friend and biographer, says "But altho' Mr. *Locke* had gain'd such a Reputation in the University, he has been often heard to say, of the first Years of his being there, that he found so little Satisfaction, in the Method that was prescrib'd them for their Study's, that he has wish'd his Father had never sent him to *Oxford,* when he found that what he had learnt there, was of little use to him, to enlighten and enlarge his Mind, and to make him more exact in his Reasonings; he fancied it was because his genius was not suited to those Study's." The scholastic philosophy he found to be "perplex'd with obscure Terms and stuff'd with useless Questions."[1]

But the Universities in Locke's day were being revitalized by the infiltration of the sciences, and by heated controversy over the political and religious issues of the time. It was Descartes, the most famous philosopher of the new science, "that brought Mr. *Locke* (as he himself told me) to relish the Study of Philosophy. For tho' he did not Assent to the Truth of all his Notions, he found that he wrote with great clearness, which made him think, that it was the fault of the Authors, rather than his own, that he had not understood some other Philosophical Books."[2] Through Descartes Locke acquired a strong interest in the sciences, particularly in their experimental branches; and it was very largely in terms of Descartes' system that Locke subsequently developed his own philosophy.

In line with this interest in the sciences Locke busied himself with chemical experiments, and meteorological observations. He also undertook the study of medicine, though he was interested in it as a science rather than as an art, and did not take a medical degree until 1674. These studies brought him into contact with a number of the most distinguished scientists of the day, notably Boyle and Sydenham. He made meteorological observations included in Boyle's *History of the Air* (1691), a book which he edited after the author's death. In 1668 he was made a fellow of the recently established Royal Society.

It was during his residence at Oxford, also, that Locke's views on politics and religion took shape. On the question of the relations of church to state he was greatly influenced by John Owen, at that time dean of Christ Church and vice-chancellor of the university. Owen, one of the leaders of the Independents, though a strong Puritan, was a champion of religious toleration in an age of warring sects. From him

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[1] Le Clerc's *The Life and Character of Mr. John Locke.* Quoted from the reprint in M. W. Calkins' *Locke's Essay Concerning Human Understanding,* pp. x–xi.

[2] *Ibid.,* p. xii.

Locke absorbed the ideal of toleration and derived the practical plan for realizing it—a broad and comprehensive church. Locke differed from Owen only in believing the Church of England to be a better basis for such an inclusive religious establishment than any non-conformist group. Accordingly, he left the Independents and joined the Church of England.

Locke might well have remained all his life an Oxford don, had it not been for an accidental meeting in 1666 with Lord Ashley, afterwards first Earl of Shaftesbury. The two men contracted an immediate and lasting friendship. Locke became virtually a member of Ashley's household, performing various secretarial and business duties—among them the selection of a suitable wife for his patron's son—and serving as a confidential adviser in political matters. He also held a number of minor governmental posts while Shaftesbury was in office, and participated in drawing up a constitution for the government of Carolina which was never put into effect.

During this residence in London, and probably about the year 1670, there occurred that meeting of "five or six friends" which started Locke on the composition of the *Essay*. The subject under discussion was "the principles of morality and revealed religion." The friends "found themselves quickly at a stand, by the difficulties that rose on every side. After we had awhile puzzled ourselves, without coming any nearer a resolution of those doubts which perplexed us, it came into my thoughts that we took a wrong course; and that before we set ourselves upon inquiries of that nature, it was necessary to examine our own abilities, and see what *objects* our understandings were, or were not, fitted to deal with. This I proposed to the company, who all readily assented; and thereupon it was agreed that this should be our first inquiry. Some hasty and undigested thoughts, on a subject I had never before considered, which I set down against our next meeting, gave the first entrance into this Discourse; which having been thus begun by chance, was continued by intreaty; written by incoherent parcels; and after long intervals of neglect, resumed again, as my humor or occasions permitted; and at not, fitted to deal with." He realized that unless we "search out the bounds between opinion and knowledge; and examine by what measures, in things whereof we have no certain knowledge, we ought to regulate our assent and moderate our persuasion,"[1] we will dissipate our intellectual energies in futile theorizing and disputation. Greatly impressed with the way in which problems were solved and controversies settled in the new sciences of nature, he hoped by his enquiry both to eliminate the remnants of scholasticism in those subjects and to introduce something of the spirit and method of scientific enquiry into the discussion of ethical, political and religious subjects. His purpose was above all a moral one, to induce men to tolerate diversity of opinion on these controverted topics by persuading them of their ignorance. He was confident that in undertaking to settle useless disputes by demonstrating the limitations of our knowledge, he would also be able to show that our knowledge is sufficient for our state and concerns. In performing this task he considered himself "to be employed as an under-laborer in clearing the ground a little, and removing some of the rubbish that lies in the way of knowledge."[2]

Locke formally defines his object in the *Essay* as an enquiry "into the original, certainty, and extent of *human Knowledge*, together with the grounds and degrees of *belief, opinion,* and *assent.*"[3] The first three books are chiefly concerned with the origin of our ideas. Locke starts with the postulate that ideas are the materials of all our knowledge. This term he uses "to stand for whatsoever is the *object* of the understanding when a man thinks," and by it he means "whatever is meant by *phantasm, notion, species,* or *whatever it is which the mind can be employed about in thinking.*"[4]

The first question being what is the origin of these ideas, Locke devotes Book I of the *Essay* to refuting the "established opinion amongst some men, that there are in the understanding certain *innate principles;* some primary notions, κοιναὶ ἔννοιαι, characters, as it were stamped upon the mind of man; which the soul receives in its very first being, and brings into the world with it."[1] Locke's argument against these supposed innate ideas depends upon his definition of idea. Since our idea is "whatsoever is the *object* of the understanding when a man thinks," it follows that to *have* an idea is to be aware of it, "*having ideas,* and *perception* being the same thing."[2] In terms of Locke's definition, therefore, 'innate' ideas would have to be the first and clearest ideas of which every human mind is aware. But it is easy for him to show that the sort of ideas which are held to be innate explicitly occur to many human minds but late, if ever: infants, idiots, savages, and, for that matter, a great number of ordinary men have them not.

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[1] *Essay,* Introduction, § 3.

[2] Epistle to the Reader.

[3] Introduction, § 2.

[4] *Ibid.,* § 8.

Locke's moral purpose in writing the *Essay* comes out strongly in his polemic against innate ideas. In attacking them he was "clearing away the rubbish" of the decadent scholasticism which still lingered on in his time, and also attacking the 'enthusiasm' and dogmatism characteristic of contemporary religious controversy. Innate ideas were to him the source of prejudice and bigotry. Their proponents made "this the principle of principles,—*that principles must not be* questioned." Thus they "eased the lazy from the pains of search, and stopped the enquiry of the doubtful."[3]

Locke now, in the remainder of the work, proposes to show "how men, barely by the use of their natural faculties, may attain to all the knowledge they have, without the help of any innate impressions; and may arrive at certainty, without any such original notions or principles."[4] He states his conception of the origin of our knowledge as follows: "Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas:—How comes it to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the *materials* of reason and knowledge? To this I answer, in one word, from EXPERIENCE. In that all our knowledge is founded; and from that it ultimately derives itself. Our observation employed either, about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the *materials* of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring."[1]

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[1] Bk. I, ch. i, § 1.

[2] Bk. II, ch. i, § 9.

[3] Bk. I, ch. iii, § 25.

[4] Bk. I, ch. i, § 1.

In the remainder of Book II he proceeds in great detail to trace out by his "plain, historical method," the way in which our various ideas originate from experience. Locke distinguishes ideas as simple and complex. Simple ideas of sensation are the "several distinct perceptions of things" according to the various ways in which our senses are affected by objects; simple ideas of reflection originate in "the perception of the operations of our own mind within us, as it is employed about the ideas it has got."[2]

Complex ideas are produced by the mind's operating upon the materials of its simple ideas combining, comparing, and distinguishing them. In this way are generated three sorts of complex ideas, of *modes, substances,* and *relations.* The bulk of Book II is taken up with a detailed analysis of certain key ideas such as those of *solidity, space, duration, number, infinity, power, causality,* and *substance.* In each case Locke tries to exhibit the meaning of the idea by disclosing its origins in experience. Locke had at first intended to pass directly from his study of the "original, sorts, and extent of our Ideas" in Book II, to the demonstration of "what use the understanding makes of them, and what Knowledge we have

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[1] Bk. II, ch. i, § 2.

[2] Bk. II, ch. i, § 3–4.

Book III
Language

by them." But, realizing that there is such a close connection between ideas and words "that it is impossible to speak clearly and distinctly of our knowledge, which all consists in propositions, without considering, first, the nature, use, and signification of Language,"[1] he introduced a third book devoted to that topic.

abstract
ab-
straho

This book is in the nature of an appendix, as the first was of a preface, to the central argument of Book II. In it Locke develops his theory of abstract ideas and general terms, and introduces the cognate distinction of *real* vs. *nominal* essences: "Words," he says, "become general by being made the signs of general ideas: and ideas become general by separating from them the circumstances of time and place, and any other ideas that may determine them to this or that particular existence. By this way of abstraction they are made capable of representing more individuals than one; each of which, having in it a conformity to that abstract idea, is (as we call it) of that sort."[2] But abstract ideas of substances represent merely the "nominal," not the "real" essence of the objects to which they refer, for the abstract idea that we have merely denotes the *coexistence* of certain qualities, "e.g., the nominal essence of gold is that complex idea the word gold stands for, let it be, for instance, a body yellow, of a certain weight, malleable, fusible, and fixed. But the real essence is the constitution of the insensible parts of that body, on which those qualities and all the other properties of gold depend. How far these two are different, though they are both called essence, is obvious."[3] This distinction between nominal and real essence becomes of crucial importance in the ensuing discussion, in Book IV, of the nature and extent of our knowledge.

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Locke is now ready to face his problem: the certainty and extent of human knowledge. By definition the mind is conversant only about its ideas; ideas themselves are not knowledge, but the materials thereof; hence knowledge must consist in the perception of a *relation:* "the perception of the connection and agreement, or disagreement and repugnancy, of any of our ideas."[1] We can perceive such agreement or disagreement: "(1) either by *intuition,* or the immediate comparing of any two ideas; or (2) by *reason,* examining the agreement or disagreement of two ideas by the intervention of some others; or (3) by *sensation,* perceiving the existence of particular things."[2] By *intuition* we may be assured of our own existence and of certain self-evident truths such as the axioms of mathematics; by *reasoning* we can demonstrate the existence of God, the propositions of mathematics, and (so Locke thinks) construct a deductive science of morality; but "of the existence of anything else, we have no other but a sensitive knowledge, which extends not beyond the objects present to our senses."[3] The reason for this sceptical conclusion in respect to our knowledge of natural objects is that we are ignorant of the real essences of bodies. Since we know these bodies only in terms of their *effects* upon our organs of sense (which are our ideas of sensation, or sensible qualities) we cannot have any certain knowledge of their real essences, i.e. "the real constitution of the minute parts on which their qualities depend." Locke has no doubt that if we could know "the figure, size, texture, and motion" of the minute parts of bodies we would be able to deduce their powers of operation upon one another and their effects upon ourselves. "But whilst we are destitute of senses acute enough to discover the minute particles of bodies, and to give us ideas of their mechanical affections, we must be content to be ignorant of their properties and ways of operation; nor can we be assured about them any farther than some few trials we make are able to reach." "And therefore," he concludes, "I am apt to doubt, that how far soever human industry may advance useful and experimental philosophy in physical things, *scientifical* will still be out of our reach; because we want perfect and adequate ideas of those very bodies which are nearest to us, and most under our command."[1]

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[1] Bk. II, ch. xxxiii, § 19.

[2] Bk. III, ch. iii, § 6.

[3] Bk. III, ch. vi, § 2.

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[1] Bk. IV, ch. i, § 2.

[2] Bk. IV, ch. iii, § 2.

[3] Bk. IV, ch. iii, § 21.

In respect to matters of fact we must then forsake the quest for certainty. A real and adequate knowledge of those universal and necessary relations, or, as Bacon would have termed them, 'forms,' which (Locke supposes) are the 'laws' of nature, is precluded by the fact that, being ourselves but natural bodies, we can never know what other bodies are beyond what is revealed in our interactions with them. Our 'real' knowledge is therefore "something very short and scanty"; "so in the greatest part of our concernment, [God] has afforded us only the twilight, as I may so say, of *probability,* suitable, I presume, to that state of mediocrity and probationership He has been pleased to place us in here."[2] Thus the *Essay* closes on the same moral note with which it opened.

Locke had made an impressive attempt to formulate a genuinely empirical theory of knowledge, in harmony with the methods and results of the mathematical and experimental sciences. As such it was enormously influential. In part this was due to the fact that he happened to hit upon a temporarily satisfactory reconciliation of traditional conceptions of knowledge with the new methods of science. His was a mediating theory suitable to an age of transition. His influence was also due to the honest and open way in which he revealed to his readers the perplexities and confusions engendered by this attempt at compromise. His critical readers found that he raised more problems than he solved. In consequence, the great empiricists of the eighteenth century, Berkeley, Hume, and Hartley, formulated their own thought very largely in terms of a direct criticism of the *Essay.*

Locke's other philosophical writings were equally successful and influential attempts to deal with vital issues of his time. The *Two Treatises of Government* were written "to establish the throne of our great restorer, our present King William; to make good his title in the consent of the people"; and "to justify to the world the people of England, whose love of their just and natural rights, with their resolution to preserve them, saved the nation when it was on the very brink of slavery and ruin."[1] In the first *Treatise* he gave the *coup de grâce* to the theory of divine right as it had been put forward by Sir Robert Filmer in his *Patriarcha* (1680); in the second, he stated his positive theory of government in terms of the regnant conceptions of natural law, natural right, and a social contract. Locke's theory, though constructed in terms of the same fictions, is the antithesis to that of Hobbes, whom, however, he ignores. Locke conceives the state of nature as itself a state of society. In this natural society men are morally bound to live according to the law of nature in mutual peace and coöperation. All men are born free and equal in respect to natural rights. Whatever a man "mixes his labor with" he makes his natural property and has the right to possess for his own use. But the love of power over others, "the first original of most vicious habits," tends constantly to produce insecurity and fear, hence the need of government. Accordingly men "join in society with others who are already united or have a mind to unite, for the mutual preservation of their lives, liberties, and estates."[2] But they do not, as with Hobbes, give up all of their natural rights to a third party, a sovereign. Instead they merely delegate some of their rights to a government, empowered to enforce a known body of law, a constitution. Thus the compact is between the people and the government. The people have the right to resist a tyranny since it has clearly dissolved the compact and is no longer a legitimate government. This presentation of the theory of government by consent remained the political scripture of the Whig Party throughout the eighteenth century, it had great effect upon subsequent political theorists such as Montesquieu and Rousseau, and it greatly influenced the framers of the American constitution.

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[1] Bk. IV, ch. iii, § 25-26.

[2] Bk. IV, ch. xiv, § 2.

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[1] *Works,* V, p. 209.
[2] *Works,* V, p. 412.

It remains briefly to indicate the import of Locke's writings on the subjects of toleration and religion. Locke, in his *Letters* on toleration, argued for a free church in a free state. All religious organizations, he thought, should be voluntary, and to them the government ought to offer protection without favor. Toleration, however, has certain practical limits: he excluded atheists and Catholics, the first on the ground that no opinion destructive of society should be tolerated, and the second because it was a sect which gave its allegiance to a foreign power. In the *Reasonableness of Christianity* Locke attempts to implement his plea for toleration by showing that there exists a set of fundamental propositions on which all Christians, however much they might differ, can agree. He finds only three beliefs to be essential to the Christian faith: in the existence of God, in the Messiahship of Jesus, and in the principles of morality as set forth in the Scriptures. The first and last of these tenets can be demonstrated by reason, as well as from Scripture, and constitute the content of natural religion. By reducing what is required on faith to the one bare essential of a belief in Christ, Locke hoped to provide the foundation for a comprehensive church establishment in which every protestant sect could be included, thus obviating further quarrel and dissent in matters of religion.

When we look at them collectively, it is clear that the whole of Locke's writings were dedicated to the inculcation of toleration in thought and practice: he believed that he had found a method in the natural sciences which, if adequately understood and applied, would curb our inveterate propensity to rash generalization and intransigent belief, a method that would enable us to transform our educational, political and religious institutions without violence and in a way that would intelligently adapt them to the real needs of a society that was in rapid process of transformation. The specific practical issues with which Locke was so deeply concerned belong to the past, but the *Essay* remains as the greatest attempt in the seventeenth century to work out a pragmatic and naturalistic theory of knowledge, and one of those few books that have exerted a formative and controlling influence on the subsequent development of philosophic thought.

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# FRANCIS BACON

## THE GREAT INSTAURATION

PROŒMIUM

PREFACE

PLAN OF THE WORK

NOVUM ORGANUM

# THE GREAT INSTAURATION

## PROŒMIUM

## FRANCIS OF VERULAM

REASONED THUS WITH HIMSELF,
AND JUDGED IT TO BE FOR THE INTEREST OF THE PRESENT AND
FUTURE GENERATIONS THAT THEY SHOULD BE MADE
ACQUAINTED WITH HIS THOUGHTS

BEING convinced that the human intellect makes its own difficulties, not using the true helps which are at man's disposal soberly and judiciously; whence follows manifold ignorance of things, and by reason of that ignorance mischiefs innumerable; he thought all trial should be made, whether that commerce between the mind of man and the nature of things, which is more precious than anything on earth, or at least than anything that is of the earth, might by any means be restored to its perfect and original condition, or if that may not be, yet reduced to a better condition than that in which it now is. Now that the errors which have hitherto prevailed, and which will prevail for ever, should (if the mind be left to go its own way), either by the natural force of the understanding or by help of the aids and instruments of logic, one by one correct themselves, was a thing not to be hoped for: because the primary notions of things which the mind readily and passively imbibes, stores up, and accumulates (and it is from them that all the rest flow) are false, confused, and overhastily abstracted from the facts; nor are the secondary and subsequent notions less arbitrary and inconstant: whence it follows that the entire fabric of human reason which we employ in the inquisition of nature, is badly put together and built up, and like some magnificent structure without any foundation. For while men are occupied in admiring and applauding the false powers of the mind, they pass by and throw away those true powers, which, if it be supplied with the proper aids and can itself be content to wait upon nature instead of vainly affecting to overrule her, are within its reach. There was but one course left, therefore,—to try the whole thing anew upon a better plan, and to commence a total reconstruction of sciences, arts, and all human knowledge, raised upon the proper foundations. And this, though in the project and undertaking it may seem a thing infinite and beyond the powers of man, yet when it comes to be dealt with it will be found sound and sober, more so than what has been done hitherto. For of this there is some issue; whereas in what is now done in the matter of science there is only a whirling round about, and perpetual agitation, ending where it began. And although he was well aware how solitary an enterprise it is, and how hard a thing to win faith and credit for; nevertheless he was resolved not to abandon either it or himself, nor to be deterred from trying and entering upon that one path which is alone open to the human mind. For better it is to make a beginning of that which may lead to something, than to engage in a perpetual struggle and pursuit in courses which have no exit. And certainly the two ways of contemplation are much like those two ways of action, so much celebrated, in this—that the one, arduous and difficult in the beginning, leads out at last into the open country; while the other, seeming at first sight easy and free from obstruction, leads to pathless and precipitous places.

Moreover, because he knew not how long it might be before these things would occur to anyone else, judging especially from this, that he has found no man hitherto who has applied his mind to the like, he resolved to publish at once so much as he has been able to complete. The cause of which haste was not ambition for himself, but solicitude for the work; that in case of his death there might remain some outline and project of that which he had conceived, and some evidence likewise of his honest mind and inclination towards the benefit of the human race. Certain it is that all other ambition whatsoever seemed poor in his eyes compared with the work which he had in hand; seeing that the matter at issue is either nothing, or a thing so great that it may well be content with its own merit, without seeking other recompense.

# PREFACE

*That the state of knowledge is not prosperous nor greatly advancing; and that a way must be opened for the human understanding entirely different from any hitherto known, and other helps provided, in order that the mind may exercise over the nature of things the authority which properly belongs to it.*

It seems to me that men do not rightly understand either their store or their strength, but overrate the one and underrate the other. Hence it follows, that either from an extravagant estimate of the value of the arts which they possess, they seek no further; or else from too mean an estimate of their own powers, they spend their strength in small matters and never put it fairly to the trial in those which go to the main. These are as the pillars of fate set in the path of knowledge; for men have neither desire nor hope to encourage them to penetrate further. And since opinion of store is one of the chief causes of want, and satisfaction with the present induces neglect of provision for the future, it becomes a thing not only useful, but absolutely necessary, that the excess of honor and admiration with which our existing stock of inventions is regarded be in the very entrance and threshold of the work, and that frankly and without circumlocution, stripped off, and men be duly warned not to exaggerate or make too much of them. For let a man look carefully into all that variety of books with which the arts and sciences abound, he will find everywhere endless repetitions of the same thing, varying in the method of treatment, but not new in substance, insomuch that the whole stock, numerous as it appears at first view, proves on examination to be but scanty. And for its value and utility it must be plainly avowed that that wisdom which we have derived principally from the Greeks is but like the boyhood of knowledge, and has the characteristic property of boys: it can talk, but it cannot generate; for it is fruitful of controversies but barren of works. So that the state of learning as it now is appears to be represented to the life in the old fable of Scylla, who had the head and face of a virgin, but her womb was hung round with barking monsters, from which she could not be delivered. For in like manner the sciences to which we are accustomed have certain general positions which are specious and flattering; but as soon as they come to particulars, which are as the parts of generation, when they should produce fruit and works, then arise contentions and barking disputations, which are the end of the matter and all the issue they can yield. Observe also, that if sciences of this kind had any life in them, that could never have come to pass which has been the case now for many ages—that they stand almost at a stay, without receiving any augmentations worthy of the human race; insomuch that many times not only what was asserted once is asserted still, but what was a question once is a question still, and instead of being resolved by discussion is only fixed and fed; and all the tradition and succession of schools is still a succession of masters and scholars, not of inventors and those who bring to further perfection the things invented. In the mechanical arts we do not find it so: they, on the contrary, as having in them some breath of life, are continually growing and becoming more perfect. As originally invented they are commonly rude, clumsy, and shapeless; afterwards they acquire new powers and more commodious arrangements and constructions; in so far that men shall sooner leave the study and pursuit of them and turn to something else, than they arrive at the ultimate perfection of which they are capable. Philosophy and the intellectual sciences, on the contrary, stand like statues, worshipped and celebrated, but not moved or advanced. Nay, they sometimes flourish most in the hands of the first author, and afterwards degenerate. For when men have once made over their judgments to others' keeping, and (like those senators whom they called *Pedarii*) have agreed to support some one person's opinion, from that time they make no enlargement of the sciences themselves, but fall to the servile office of embellishing certain individual authors and increasing their retinue. And let it not be said that the sciences have been growing gradually till they have at last reached their full stature, and so (their course being completed) have settled in the works of a few writers; and that there being now no room for the invention of better, all that remains is to embellish and cultivate those things which have been invented already. Would it were so! But the truth is that this appropriating of the sciences has its origin in nothing better than the confidence of a few persons and the sloth and indolence of the rest. For after the sciences had been in several parts perhaps cultivated and handled diligently, there has risen up some man of bold disposition, and famous for methods and short ways which people like, who has in appearance reduced them to an art, while he has in fact only spoiled all that the others had done. And yet this is what posterity like, because it makes the work short and easy, and saves further inquiry, of which they are weary and impatient. And if anyone take this general acquiescence and consent for an argument of weight, as being the judgment of Time, let me tell him that the reasoning on which he relies is most fallacious and weak. For, first, we are far from knowing all that in the matter of sciences and arts has in various ages and places been brought to light and published; much less, all that has been by private persons secretly attempted and stirred; so neither the births nor the miscarriages of Time are entered in our records. Nor, secondly, is the consent itself and the time it has continued a consideration of much worth. For however various are the forms of civil polities, there is but one form of polity in the sciences;

and that always has been and always will be popular. Now the doctrines which find most favor with the populace are those which are either contentious and pugnacious, or specious and empty; such, I say, as either entangle assent or tickle it. And therefore no doubt the greatest wits in each successive age have been forced out of their own course; men of capacity and intellect above the vulgar having been fain, for reputation's sake, to bow to the judgment of the time and the multitude; and thus if any contemplations of a higher order took light anywhere, they were presently blown out by the winds of vulgar opinions. So that Time is like a river, which has brought down to us things light and puffed up, while those which are weighty and solid have sunk. Nay, those very authors who have usurped a kind of dictatorship in the sciences and taken upon them to lay down the law with such confidence, yet when from time to time they come to themselves again, they fall to complaints of the subtlety of nature, the hiding-places of truth, the obscurity of things, the entanglement of causes, the weakness of the human mind; wherein nevertheless they show themselves never the more modest, seeing that they will rather lay the blame upon the common condition of men and nature than upon themselves. And then whatever any art fails to attain, they ever set it down upon the authority of that art itself as impossible of attainment; and how can art be found guilty when it is judge in its own cause? So it is but a device for exempting ignorance from ignominy. Now for those things which are delivered and received, this is their condition: barren of works, full of questions; in point of enlargement slow and languid; carrying a show of perfection in the whole, but in the parts ill filled up; in selection popular, and unsatisfactory even to those who propound them; and therefore fenced round and set forth with sundry artifices. And if there be any who have determined to make trial for themselves, and put their own strength to the work of advancing the boundaries of the sciences, yet have they not ventured to cast themselves completely loose from received opinions or to seek their knowledge at the fountain; but they think they have done some great thing if they do but add and introduce into the existing sum of science something of their own; prudently considering with themselves that by making the addition they can assert their liberty, while they retain the credit of modesty by assenting to the rest. But these mediocrities and middle ways so much praised, in deferring to opinions and customs, turn to the great detriment of the sciences. For it is hardly possible at once to admire an author and to go beyond him; knowledge being as water, which will not rise above the level from which it fell. Men of this kind, therefore, amend some things, but advance little; and improve the condition of knowledge, but do not extend its range. Some, indeed, there have been who have gone more boldly to work, and taking it all for an open matter and giving their genius full play, have made a passage for themselves and their own opinions by pulling down and demolishing former ones; and yet all their stir has but little advanced the matter; since their aim has been not to extend philosophy and the arts in substance and value, but only to change doctrines and transfer the kingdom of opinions to themselves; whereby little has indeed been gained, for though the error be the opposite of the other, the causes of erring are the same in both. And if there have been any who, not binding themselves either to other men's opinions or to their own, but loving liberty, have desired to engage others along with themselves in search, these, though honest in intention, have been weak in endeavor. For they have been content to follow probable reasons, and are carried round in a whirl of arguments, and in the promiscuous liberty of search have relaxed the severity of inquiry. There is none who has dwelt upon experience and the facts of nature as long as is necessary. Some there are indeed who have committed themselves to the waves of experience, and almost turned mechanics; yet these again have in their very experiments pursued a kind of wandering inquiry, without any regular system of operations. And besides they have mostly proposed to themselves certain petty tasks, taking it for a great matter to work out some single discovery;—a course of proceeding at once poor in aim and unskillful in design. For no man can rightly and successfully investigate the nature of anything in the thing itself; let him vary his experiments as laboriously as he will, he never comes to a resting-place, but still finds something to seek beyond. And there is another thing to be remembered: namely, that all industry in experimenting has begun with proposing to itself certain definite works to be accomplished, and has pursued them with premature and unseasonable eagerness; it has sought, I say, experiments of Fruit, not experiments of Light; not imitating the divine procedure, which in its first day's work created light only and assigned to it one entire day; on which day it produced no material work, but proceeded to that on the days following. As for those who have given the first place to Logic, supposing that the surest helps to the sciences were to be found in that, they have indeed most truly and excellently perceived that the human intellect left to its own course is not to be trusted; but then the remedy is altogether too weak for the disease, nor is it without evil in itself. For the Logic which is received, though it be very properly applied to civil business and to those arts which rest in discourse and opinion, is not nearly subtle enough to deal with nature; and in offering at what it cannot master, has done more to establish and perpetuate error than to open the way to truth.

Upon the whole therefore, it seems that men have not been happy hitherto either in the trust which they have placed in others or in their own industry with regard to the sciences; especially as neither the demonstrations nor the experiments as yet known are much to be relied upon. But the universe to the eye of the human understanding is framed like a labyrinth; presenting as it does on every side so many ambiguities of way, such deceitful resemblances of objects and signs, natures so irregular in their lines, and so knotted and entangled. And then the way is still to be made by the uncertain light of the sense, sometimes shining out, sometimes clouded over, through the woods of experience and particulars: while those who offer themselves for guides are (as was said) themselves also puzzled, and increase the number of errors and wanderers. In circumstances so difficult, neither the natural force of man's judgment nor even any accidental felicity offers any chance of success. No excellence of wit, no repetition of chance experiments, can overcome such difficulties as these. Our steps must be guided by a clue, and the whole way from the very first perception of the senses must be laid out upon a sure plan. Not that I would be understood to mean that nothing whatever has been done in so many ages by so great labors. We have no reason to be ashamed of the discoveries which have been made, and no doubt the ancients proved themselves in everything that turns on wit and abstract meditation, wonderful men. But as in former ages when men sailed only by observation of the stars, they could indeed coast along the shores of the old continent or cross a few small and mediterranean seas; but before the ocean could be traversed and the new world discovered, the use of the mariner's needle, as a more faithful and certain guide, had to be found out: in like manner the discoveries which have been hitherto made in the arts and sciences are such as might be made by practice, meditation, observation, argumentation—for they lay near to the senses, and immediately beneath common notions; but before we can reach the remoter and more hidden parts of nature, it is necessary that a more perfect use and application of the human mind and intellect be introduced.

For my own part at least, in obedience to the everlasting love of truth, I have committed myself to the uncertainties and difficulties and solitudes of the ways, and relying on the divine assistance have upheld my mind both against the shocks and embattled ranks of opinion, and against my own private and inward hesitations and scruples, and against the fogs and clouds of nature, and the phantoms flitting about on every side; in the hope of providing at last for the present and future generations guidance more faithful and secure. Wherein if I have made any progress, the way has been opened to me by no other means than the true and legitimate humiliation of the human spirit. For all those who before me have applied themselves to the invention of arts have but cast a glance or two upon facts and examples and experience, and straightway proceeded, as if invention were nothing more than an exercise of thought, to invoke their own spirits to give them oracles. I, on the contrary, dwelling purely and constantly among the facts of nature, withdraw my intellect from them no further than may suffice to let the images and rays of natural objects meet in a point, as they do in the sense of vision; whence it follows that the strength and excellency of the wit has but little to do in the matter. And the same humility which I use in inventing I employ likewise in teaching. For I do not endeavor either by triumphs of confutation, or pleadings of antiquity, or assumption of authority, or even by the veil of obscurity, to invest these inventions of mine with any majesty; which might easily be done by one who sought to give luster to his own name rather than light to other men's minds. I have not sought (I say) nor do I seek either to force or ensnare men's judgments; but I lead them to things themselves and the concordance of things, that they may see for themselves what they have, what they can dispute, what they can add and contribute to the common stock. And for myself, if in anything I have been either too credulous or too little awake and attentive, or if I have fallen off by the way and left the inquiry incomplete, nevertheless I so present these things naked and open, that my errors can be marked and set aside before the mass of knowledge be further infected by them; and it will be easy also for others to continue and carry on my labors. And by these means I suppose that I have established for ever a true and lawful marriage between the empirical and the rational faculty, the unkind and ill-starred divorce and separation of which has thrown into confusion all the affairs of the human family.

Wherefore, seeing that these things do not depend upon myself, at the outset of the work I most humbly and fervently pray to God the Father, God the Son, and God the Holy Ghost, that remembering the sorrows of mankind and the pil-

### liii

The *Idols of the Cave* take their rise in the peculiar constitution, mental or bodily, of each individual; and also in education, habit, and accident. Of this kind there is a great number and variety; but I will instance those the pointing out of which contains the most important caution, and which have most effect in disturbing the clearness of the understanding.

### liv

Men become attached to certain particular sciences and speculations, either because they fancy themselves the authors and inventors thereof, or because they have bestowed the greatest pains upon them and become most habituated to them. But men of this kind, if they betake themselves to philosophy and contemplations of a general character, distort and color them in obedience to their former fancies; a thing especially to be noticed in Aristotle, who made his natural philosophy a mere bond-servant to his logic, thereby rendering it contentious and well nigh useless. The race of chemists again out of a few experiments of the furnace have built up a fantastic philosophy, framed with reference to a few things; and Gilbert also, after he had employed himself most laboriously in the study and observation of the lodestone, proceeded at once to construct an entire system in accordance with his favorite subject.

### lv

There is one principal and as it were radical distinction between different minds, in respect of philosophy and the sciences; which is this: that some minds are stronger and apter to mark the differences of things, others to mark their resemblances. The steady and acute mind can fix its contemplations and dwell and fasten on the subtlest distinctions; the lofty and discursive mind recognizes and puts together the finest and most general resemblances. Both kinds however easily err in excess, by catching the one at gradations the other at shadows.

### lvi

There are found some minds given to an extreme admiration of antiquity, others to an extreme love and appetite for novelty; but few so duly tempered that they can hold the mean, neither carping at what has been well laid down by the ancients, nor despising what is well introduced by the moderns. This however turns to the great injury of the sciences and philosophy: since these affectations of antiquity and novelty are the humors of partisans rather than judgments; and truth is to be sought for not in the felicity of any age, which is an unstable thing, but in the light of nature and experience, which is eternal. These factions therefore must be abjured, and care must be taken that the intellect be not hurried by them into assent.

### lvii

Contemplations of nature and of bodies in their simple form break up and distract the understanding, while contemplations of nature and bodies in their composition and configuration overpower and dissolve the understanding: a distinction well seen in the school of Leucippus and Democritus as compared with the other philosophies. For that school is so busied with the particles that it hardly attends to the structure; while the others are so lost in admiration of the structure that they do not penetrate to the simplicity of nature. These kinds of contemplation should therefore be alternated and taken by turns; that so the understanding may be rendered at once penetrating and comprehensive, and the inconveniences above mentioned, with the idols which proceed from them, may be avoided.

### lviii

Let such then be our provision and contemplative prudence for keeping off and dislodging the Idols of the Cave, which grow for the most part either out of the predominance of a favorite subject, or out of an excessive tendency to compare or to distinguish, or out of partiality for particular ages, or out of the largeness or minuteness of the objects contemplated. And generally let every student of nature take this as a rule,—that whatever his mind seizes and dwells upon with peculiar satisfaction is to be held in suspicion, and that so much the more care is to be taken in dealing with such questions to keep the understanding even and clear.

### lix

But the *Idols of the Market-place* are the most troublesome of all: idols which have crept into the understanding through the alliances of words and names. For men believe that their reason governs words; but it is also true that words react on the understanding; and this it is that has rendered philosophy and the sciences sophistical and inactive. Now words, being commonly framed and applied according to the capacity of the vulgar, follow those lines of division which are most obvious to the vulgar understanding. And whenever an understanding of greater acuteness or a more diligent observation would alter those lines to suit the true divisions of nature, words stand in the way and resist the change. Whence it comes to pass that the high and formal discussions of learned men end oftentimes in disputes about words and names; with which (according to the use and wisdom of the mathematicians) it would be more prudent to begin, and so by means of definitions reduce them to order. Yet even definitions cannot cure this evil in dealing with natural and material things; since the definitions themselves consist of words, and those words beget others: so that it is necessary to recur to individual instances, and those in due series and order; as I shall say presently when I come to the method and scheme for the formation of notions and axioms.

### lx

The Idols imposed by words on the understanding are of two kinds. They are either names of things which do not exist (for as there are things left unnamed through lack of observation, so likewise are there names which result from fantastic suppositions and to which nothing in reality corresponds), or they are names of things which exist, but yet confused and ill-defined, and hastily and irregularly derived from realities. Of the former kind are Fortune, the Prime Mover, Planetary Orbits, Element of Fire, and like fictions which owe their origin to false and idle theories. And this class of idols is more easily expelled, because to get rid of them it is only necessary that all theories should be steadily rejected and dismissed as obsolete.

But the other class, which springs out of a faulty and unskillful abstraction, is intricate and deeply rooted. Let us take for example such a word as *humid,* and see how far the several things which the word is used to signify agree with each other; and we shall find the word *humid* to be nothing else than a mark loosely and confusedly applied to denote a variety of actions which will not bear to be reduced to any constant meaning. For it both signifies that which easily spreads itself round any other body; and that which in itself is indeterminate and cannot solidize; and that which readily yields in every direction; and that which easily divides and scatters itself; and that which easily unites and collects itself; and that which readily flows and is put in motion; and that which readily clings to another body and wets it; and that which is easily reduced to a liquid, or being solid easily melts. Accordingly when you come to apply the word,—if you take it in one sense, flame is humid; if in another, air is not humid; if in another, fine dust is humid; if in another, glass is humid. So that it is easy to see that the notion is taken by abstraction only from water and common and ordinary liquids, without any due verification.

There are however in words certain degrees of distortion and error. One of the least faulty kinds is that of names of substances, especially of lowest species and well-deduced (for the notion of *chalk* and of *mud* is good, of *earth* bad); a more faulty kind is that of actions, as *to generate, to corrupt, to* *alter;* the most faulty is of qualities (except such as are the immediate objects of the sense) as *heavy, light, rare, dense,* and the like. Yet in all these cases some notions are of necessity a little better than others, in proportion to the greater variety of subjects that fall within the range of the human sense.

### lxi

But the *Idols of the Theater* are not innate, nor do they steal into the understanding secretly, but are plainly impressed and received into the mind from the play-books of philosophical systems and the perverted rules of demonstration. To attempt refutations in this case would be merely inconsistent with what I have already said: for since we agree neither upon principles nor upon demonstrations there is no place for argument. And this is so far well, inasmuch as it leaves the honor of the ancients untouched. For they are no wise disparaged—the question between them and me being only as to the way. For as the saying is, the lame man who keeps the right road outstrips the runner who takes a wrong one. Nay it is obvious that when a man runs the wrong way, the more active and swift he is the further he will go astray.

But the course I propose for the discovery of sciences is such as leaves but little to the acuteness and strength of wits, but places all wits and understandings nearly on a level. For as in the drawing of a straight line or a perfect circle, much depends on the steadiness and practice of the hand, if it be done by aim of hand only, but if with the aid of rule or compass, little or nothing; so is it exactly with my plan. But though particular confutations would be of no avail, yet touching the sects and general divisions of such systems I must say something; something also touching the external signs which show that they are unsound; and finally something touching the causes of such great infelicity and of such lasting and general agreement in error; that so the access to truth may be made less difficult, and the human understanding may the more willingly submit to its purgation and dismiss its idols.

### lxii

Idols of the Theater, or of Systems, are many, and there can be and perhaps will be yet many more. For were it not that now for many ages men's minds have been busied with religion and theology; and were it not that civil governments, especially monarchies, have been averse to such novelties, even in matters speculative; so that men labor therein to the peril and harming of their fortunes,—not only unrewarded, but exposed also to contempt and envy: doubtless there would have arisen many other philosophical sects like to those which in great variety flourished once among the Greeks. For as on the phenomena of the heavens many hypotheses may be constructed, so likewise (and more also) many various dogmas may be set up and established on the phenomena of philosophy. And in the plays of this philosophical theater you may observe the same thing which is found in the theater of the poets, that stories invented for the stage are more compact and elegant, and more as one would wish them to be, than true stories out of history.

In general however there is taken for the material of philosophy either a great deal out of a few things, or a very little out of many things; so that on both sides philosophy is based on too narrow a foundation of experiment and natural history, and decides on the authority of too few cases. For the rational school of philosophers snatches from experience a variety of common instances, neither duly ascertained nor diligently examined and weighed, and leaves all the rest to meditation and agitation of wit.

There is also another class of philosophers, who having bestowed much diligent and careful labor on a few experiments, have thence made bold to educe and construct systems; wresting all other facts in a strange fashion to conformity therewith.

And there is yet a third class, consisting of those who out of faith and veneration mix their philosophy with theology and traditions; among whom the vanity of some has gone so far aside as to seek the origin of sciences among spirits and genii. So that this parent stock of errors—this false philosophy—is of three kinds; the *sophistical,* the *empirical,* and the *superstitious.*

## lxiii

The most conspicuous example of the first class was Aristotle, who corrupted natural philosophy by his logic: fashioning the world out of categories; assigning to the human soul, the noblest of substances, a genus from words of the second intention; doing the business of density and rarity (which is to make bodies of greater or less dimensions, that is, occupy greater or less spaces), by the frigid distinction of act and power; asserting that single bodies have each a single and proper motion, and that if they participate in any other, then this results from an external cause; and imposing countless other arbitrary restrictions on the nature of things: being always more solicitous to provide an answer to the question and affirm something positive in words, than about the inner truth of things; a failing best shown when his philosophy is compared with other systems of note among the Greeks. For the *homœomera* of Anaxagoras; the atoms of Leucippus and Democritus; the Heaven and Earth of Parmenides; the Strife and Friendship of Empedocles; Heraclitus's doctrine how bodies are resolved into the indifferent nature of fire, and remolded into solids; have all of them some taste of the natural philosopher,—some savor of the nature of things, and experience, and bodies; whereas in the physics of Aristotle you hear hardly anything but the words of logic; which in his metaphysics also, under a more imposing name, and more forsooth as a realist than a nominalist, he has handled over again. Nor let any weight be given to the fact that in his books on animals, and his *Problems,* and other of his treatises, there is frequent dealing with experiments. For he had come to his conclusion before: he did not consult experience, as he should have done, in order to the framing of his decisions and axioms; but having first determined the question according to his will, he then resorts to experience, and bending her into conformity with his placets leads her about like a captive in a procession: so that even on this count he is more guilty than his modern followers, the schoolmen, who have abandoned experience altogether.

### lxiv

But the empirical school of philosophy gives birth to dogmas more deformed and monstrous than the sophistical or rational school. For it has its foundations not in the light of common notions (which, though it be a faint and superficial light, is yet in a manner universal, and has reference to many things) but in the narrowness and darkness of a few experiments. To those therefore who are daily busied with these experiments, and have infected their imagination with them, such a philosophy seems probable and all but certain; to all men else incredible and vain. Of this there is a notable instance in the alchemists and their dogmas; though it is hardly to be found elsewhere in these times, except perhaps in the philosophy of Gilbert. Nevertheless with regard to philosophies of this kind there is one caution not to be omitted; for I foresee that if ever men are roused by my admonitions to betake themselves seriously to experiment and bid farewell to sophistical doctrines, then indeed through the premature hurry of the understanding to leap or fly to universals and principles of things, great danger may be apprehended from philosophies of this kind; against which evil we ought even now to prepare.

### lxv

But the corruption of philosophy by superstition and an admixture of theology is far more widely spread, and does the greatest harm, whether to entire systems or to their parts. For the human understanding is obnoxious to the influence of the imagination no less than to the influence of common notions. For the contentious and sophistical kind of philosophy ensnares the understanding; but this kind, being fanciful and tumid and half poetical, misleads it more by flattery. For there is in man an ambition of the understanding, no less than of the will, especially in high and lofty spirits.

Of this kind we have among the Greeks a striking example in Pythagoras, though he united with it a coarser and more cumbrous superstition; another in Plato and his school, more dangerous and subtle. It shows itself likewise in parts of other philosophies, in the introduction of abstract forms and final causes and first causes, with the omission in most cases of causes intermediate, and the like. Upon this point the greatest caution should be used. For nothing is so mischievous as the apotheosis of error; and it is a very plague of the understanding for vanity to become the object of veneration. Yet in this vanity some of the moderns have with extreme levity indulged so far as to attempt to found a system of natural philosophy on the first chapters of Genesis, on the book of Job, and other parts of the sacred writings; seeking for the dead among the living: which also makes the inhibition and repression of it the more important, because from this unwholesome mixture of things human and divine there arises not only a fantastic philosophy but also an heretical religion. Very meet it is therefore that we be sober-minded, and give to faith that only which is faith's.

### lxvi

So much then for the mischievous authorities of systems, which are founded either on common notions, or on a few experiments, or on superstition. It remains to speak of the faulty subject-matter of contemplations, especially in natural philosophy. Now the human understanding is infected by the sight of what takes place in the mechanical arts, in which the alteration of bodies proceeds chiefly by composition or separation, and so imagines that something similar goes on in the universal nature of things. From this source has flowed the fiction of elements, and of their concourse for the formation of natural bodies. Again, when man contemplates nature working freely, he meets with different species of things, of animals, of plants, of minerals; whence he readily passes into the opinion that there are in nature certain primary forms which nature intends to educe, and that the remaining variety proceeds from hindrances and aberrations of nature in the fulfilment of her work, or from the collision of different species and the transplanting of one into another. To the first of these speculations we owe our primary qualities of the elements; to the other our occult properties and specific virtues; and both of them belong to those empty *compendia* of thought wherein the mind rests, and whereby it is diverted from more solid pursuits. It is to better purpose that the physicians bestow their labor on the secondary qualities of matter, and the operations of attraction, repulsion, attenuation, conspissation, dilatation, astriction, dissipation, maturation, and the like; and were it not that by those two compendia which I have mentioned (elementary qualities, to wit, and specific virtues) they corrupted their correct observations in these other matters,—either reducing them to first qualities and their subtle and incommensurable mixtures, or not following them out with greater and more diligent observation to third and fourth qualities, but breaking off the scrutiny prematurely,—they had made much greater progress. Nor are powers of this kind (I do not say the same, but similar) to be sought for only in the medicines of the human body, but also in the changes of all other bodies.

But it is a far greater evil that they make the quiescent principles, *wherefrom,* and not the moving principles, *whereby,* things are produced, the object of their contemplation and inquiry. For the former tend to discourse, the latter to works. Nor is there any value in those vulgar distinctions of motion which are observed in the received system of natural philosophy, as generation, corruption, augmentation, diminution, alteration, and local motion. What they mean no doubt is this: If a body, in other respects not changed, be moved from its place, this is *local motion;* if without change of place or essence, it be changed in quality, this is *alteration;* if by reason of the change the mass and quantity of the body do not remain the same, this is *augmentation* or *diminution;* if they be changed to such a degree that they change their very essence and substance and turn to something else, this is *generation* and *corruption.* But all this is merely popular, and does not at all go deep into nature; for these are only measures and limits, not kinds of motion. What they intimate is *how far,* not *by what means,* or *from what source.* For they do not suggest anything with regard either to the desires of bodies or to the development of their parts: it is only when that motion presents the thing grossly and palpably to the sense as different from what it was, that they begin to mark the division. Even when they wish to suggest something with regard to the causes of motion, and to establish a division with reference to them, they introduce with the greatest negligence a distinction between motion natural and violent; a distinction which is itself drawn entirely from a vulgar notion, since all violent motion is also in fact natural; the external efficient simply setting nature working otherwise than it was before. But if, leaving all this, anyone shall observe (for instance) that there is in bodies a desire of mutual contact, so as not to suffer the unity of nature to be quite separated or broken and a vacuum thus made; or if anyone say that there is in bodies a desire of resuming their natural dimensions or tension, so that if compressed within or extended beyond them, they immediately strive to recover themselves, and fall back to their old volume and extent; or if anyone say that there is in bodies a desire of congregating towards masses of kindred nature,—of dense bodies, for instance, towards the globe of the earth, of thin and rare bodies towards the compass of the sky; all these and the like are truly physical kinds of motion;—but those others are entirely logical and scholastic, as is abundantly manifest from this comparison.

Nor again is it a less evil, that in their philosophies and contemplations their labor is spent in investigating and handling the first principles of things and the highest generalities of nature; whereas utility and the means of working result entirely from things intermediate. Hence it is that men cease not from abstracting nature till they come to potential and uninformed matter, nor on the other hand from dissecting nature till they reach the atom; things which, even if true, can do but little for the welfare of mankind.

### lxvii

A caution must also be given to the understanding against the intemperance which systems of philosophy manifest in giving or withholding assent; because intemperance of this kind seems to establish Idols and in some sort to perpetuate them, leaving no way open to reach and dislodge them.

This excess is of two kinds: the first being manifest in those who are ready in deciding; and render sciences dogmatic and magisterial; the other in those who deny that we can know anything, and so introduce a wandering kind of inquiry that leads to nothing; of which kinds the former subdues, the latter weakens the understanding. For the philosophy of Aristotle, after having by hostile confutations destroyed all the rest (as the Ottomans serve their brothers), has laid down the law on all points: which done, he proceeds himself to raise new questions of his own suggestion, and dispose of them likewise; so that nothing may remain that is not certain and decided,—a practice which holds and is in use among his successors.

The school of Plato, on the other hand, introduced *Acatalepsia,* at first in jest and irony, and in disdain of the older sophists, Protagoras, Hippias, and the rest, who were of nothing else so much ashamed as of seeming to doubt about anything. But the New Academy made a dogma of it, and held it as a tenet. And though theirs is a fairer seeming way than arbitrary decisions; since they say that they by no means destroy all investigation, like Pyrrho and his Refrainers, but allow of some things to be followed as probable, though of none to be maintained as true; yet still when the human mind has once despaired of finding truth, its interest in all things grows fainter; and the result is that men turn aside to pleasant disputations and discourses and roam as it were from object to object, rather than keep on a course of severe inquisition. But, as I said at the beginning and am ever urging, the human senses and understanding, weak as they are, are not to be deprived of their authority, but to be supplied with helps.

### lxviii

So much concerning the several classes of Idols, and their equipage: all of which must be renounced and put away with a fixed and solemn determination, and the understanding thoroughly freed and cleansed; the entrance into the kingdom of man, founded on the sciences, being not much other than the entrance into the kingdom of heaven, whereinto none may enter except as a little child.

### lxix

But vicious demonstrations are as the strongholds and defences of Idols; and those we have in logic do little else than make the world the bond-slave of human thought, and human thought the bond-slave of words. Demonstrations truly are in effect the philosophies themselves and the sciences. For such as *they* are, well or ill established, such are the systems of philosophy and the contemplations which follow. Now in the whole of the process which leads from the sense and objects to axioms and conclusions, the demonstrations which we use are deceptive and incompetent. This process consists of four parts, and has as many faults. In the first place, the impressions of the sense itself are faulty; for the sense both fails us and deceives us. But its shortcomings are to be supplied, and its deceptions to be corrected. Secondly, notions are ill drawn from the impressions of the senses, and are indefinite and confused, whereas they should be definite and distinctly bounded. Thirdly, the induction is amiss which infers the principles of sciences by simple enumeration, and does not, as it ought, employ exclusions and solutions (or separations) of nature. Lastly, that method of discovery and proof according to which the most general principles are first established, and then intermediate axioms are tried and proved by them, is the parent of error and the curse of all science. Of these things however, which now I do but touch upon, I will speak more largely, when, having performed these expiations and purgings of the mind, I come to set forth the true way for the interpretation of nature.

### lxx

But the best demonstration by far is experience, if it go not beyond the actual experiment. For if it be transferred to other cases which are deemed similar, unless such transfer be made by a just and orderly process, it is a fallacious thing. But the manner of making experiments which men now use is blind and stupid. And therefore, wandering and straying as they do with no settled course, and taking counsel only from things as they fall out, they fetch a wide circuit and meet with many matters, but make little progress; and sometimes are full of hope, sometimes are distracted; and always find that there is something beyond to be sought. For it generally happens that men make their trials carelessly, and as it were in play; slightly varying experiments already known, and, if the thing does not answer, growing weary and abandoning the attempt. And even if they apply themselves to experiments more seriously and earnestly and laboriously, still they spend their labor in working out some one experiment, as Gilbert with the magnet, and the chemists with gold,—a course of proceeding not less unskillful in the design than small in the attempt. For no one successfully investigates the nature of a thing in the thing itself; the inquiry must be enlarged, so as to become more general.

And even when they seek to educe some science or theory from their experiments, they nevertheless almost always turn aside with overhasty and unseasonable eagerness to practice; not only for the sake of the uses and fruits of the practice, but from impatience to obtain in the shape of some new work an assurance for themselves that it is worth their while to go on;

and also to show themselves off to the world, and so raise the credit of the business in which they are engaged. Thus, like Atalanta, they go aside to pick up the golden apple, but meanwhile they interrupt their course, and let the victory escape them. But in the true course of experience, and in carrying it on to the effecting of new works, the divine wisdom and order must be our pattern. Now God on the first day of creation created light only, giving to that work an entire day, in which no material substance was created. So must we likewise from experience of every kind first endeavor to discover true causes and axioms; and seek for experiments of Light, not for experiments of Fruit. For axioms rightly discovered and established supply practice with its instruments, not one by one, but in clusters, and draw after them trains and troops of works. Of the paths however of experience, which no less than the paths of judgment are impeded and beset, I will speak hereafter; here I have only mentioned ordinary experimental research as a bad kind of demonstration. But now the order of the matter in hand leads me to add something both as to those *signs* which I lately mentioned,—signs that the system of philosophy and contemplation in use are in a bad condition,—and also as to the *causes* of what seems at first so strange and incredible. For a knowledge of the signs prepares assent; an explanation of the causes removes the marvel: which two things will do much to render the extirpation of Idols from the understanding more easy and gentle . . .

[Aphorisms lxxi to xci, here omitted, fall into two groups: lxxi to lxxviii treat of the signs that show the defective and impotent character of the received sciences; lxxix to xci treat of the causes of those errors that have prevented or hindered the progress of the sciences.

The signs of truth and soundness in the received sciences are to be drawn "from their origin, or from their fruits, or from their progress, or from the confessions of their founders, or from general consent." The sciences we possess mainly originated with the Greeks. But "the character of that country and nation" predisposed them to disputation rather than inquiry; the Greeks are like boys, "they are prompt to prattle, but cannot generate; for their wisdom abounds in words but is barren of works." Nor was the character of the time and age propitious for science: they had no history, and in comparison with our stock of knowledge and experience were but ignorant youths. As to the fruits of their knowledge, they have been but the "thorns and briars of dispute and contention." These ignorant and disputatious systems have shown change without progress: "For what is founded on nature grows and increases; while what is founded on opinion varies but increases not." Again, by their constant "complaints of the subtlety of nature, the obscurity of things, and the weakness of the human mind," and their perpetual strife among themselves, they confess the futility of their pretentions. And, finally, the supposal that there was, eventually, among the ancients, general consent to the authority of Aristotle is false: "the systems of Aristotle and Plato, like planks of lighter and less solid material, floated on the waves of time and were preserved"; "time, like a river, bringing down to us things which are light and puffed up, but letting weighty matters sink."

The causes of those errors that have hindered the progress of the sciences are many and potent. First, the actual periods within which science has been cultivated have been very short: only the Greeks, the Romans, and, in recent times, the nations of Western Europe have for short intervals seriously improved our knowledge. And throughout all time, the greater part of wit and diligence has been devoted to moral philosophy, as with the ancients, or to theology, among the moderns, rather than to natural philosophy which is "the great mother of the sciences." Again, the goal itself has not been rightly placed, men have sought through their studies gain or reputation, or to justify old truth, rather than to search out things undiscovered. "Now the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and powers." Since men have so rarely pursued this end, it is not strange that they have erred as to the means. Or, when men have placed the goal aright, they have chosen a way to it erroneous and impossible: instead of the "opening and laying out of a road for the human understanding direct from the sense, by a course of experiment orderly conducted and well build up," all has been "left either to the mist of tradition, or the whirl and eddy of argument, or the fluctuations and mazes of chance and of vague and ill-digested experience." Thus "the admiration of antiquity, authority, and consent" has caused men to be content with the poverty and scantiness of existing knowledge. "Moreover the ancient systems have received no slight accession of reputation and credit from the vanity and levity of those who have propounded new ones." Another troublesome adversary that has afflicted natural philosophy in all ages is "superstition, and the blind and immoderate zeal of religion." Those who thus confuse natural philosophy with theology feel the search after natural causes to be an impiety, or they consider "that if second causes are unknown everything can more readily be referred to the divine hand and rod," or they "fear from past example that movements and changes in philosophy will end in assaults on religion . . . But these two last fears seem to me to savor utterly of carnal wisdom; as if men in the recesses and secret thoughts of their hearts doubted and distrusted the strength of religion and the empire of faith over the sense, and therefore feared that the investigation of truth in nature might be dangerous to them. But if the matter be truly considered, natural philosophy is after the word of God at once the surest medicine against superstition, and the most approved nourishment for faith; and therefore she is rightly given to religion as her most faithful handmaid, since the one displays the will of God, the other His power." Again, in the schools, academies, colleges and similar learned bodies everything is found adverse to the progress of science. The "lectures and exercises there are so ordered, that to think or speculate on anything out of the common way can hardly occur to any man." And the vested intellectual interests there seated ignore and contemn all liberty of judgment or originality of spirit. Finally, even if such jealousy were to cease, still true learning goes unrewarded and unhonored, for the reward of learning is in the hands of the unlearned, and "it is nothing strange if a thing not held in honor does not prosper."]

## xcii

But by far the greatest obstacle to the progress of science and to the undertaking of new tasks and provinces therein, is found in this—that men despair and think things impossible, For wise and serious men are wont in these matters to be altogether distrustful; considering with themselves the obscurity of nature, the shortness of life, the deceitfulness of the senses, the weakness of the judgment, the difficulty of experiment and the like; and so supposing that in the revolution of time and of the ages of the world the sciences have their ebbs and flows; that at one season they grow and flourish, at another wither and decay, yet in such sort that when they have reached a certain point and condition they can advance no further. If therefore any one believes or promises more, they think this comes of an ungoverned and unripened mind, and that such attempts have prosperous beginnings, become difficult as they go on, and end in confusion. Now since these are thoughts which naturally present themselves to grave men and of great judgment, we must take good heed that we be not led away by our love for a most fair and excellent object to relax or diminish the severity of our judgment; we must observe diligently what encouragement dawns upon us and from what quarter; and, putting aside the lighter breezes of hope, we must thoroughly sift and examine those which promise greater steadiness and constancy. Nay, and we must take state-prudence too into our counsels, whose rule is to distrust, and to take the less favorable view of human affairs. I am now therefore to speak touching *hope;* especially as I am not a dealer in promises, and wish neither to force nor to ensnare men's judgments, but to lead them by the hand with their good will. And though the strongest means of inspiring hope will be to bring men to particulars; especially to particulars digested and arranged in my Tables of Discovery (the subject partly of the second, but much more of the fourth part of my *Instauration*), since this is not merely the promise of the thing but the thing itself: nevertheless that everything may be done with gentleness, I will proceed with my plan of preparing men's minds; of which preparation to give hope is no unimportant part. For without it the rest tends rather to make men sad (by giving them a worse and meaner opinion of things as they are than they now have, and making them more fully to feel and know the unhappiness of their own condition) than to induce any alacrity or to whet their industry in making trial. And therefore it is fit that I publish and set forth those conjectures of mine which make hope in this matter reasonable: just as Columbus did, before that wonderful voyage of his across the Atlantic, when he gave the reasons for his conviction that new lands and continents might be discovered besides those which were known before; which reasons, though rejected at first, were afterwards made good by experience, and were the causes and beginnings of great events.

### xciii

The beginning is from God: for the business which is in hand, having the character of good so strongly impressed upon it, appears manifestly to proceed from God, who is the Author of Good, and the Father of Lights. Now in divine operations even the smallest beginnings lead of a certainty to their end. And as it was said of spiritual things, "The kingdom of God cometh not with observation," so is it in all the greater works of Divine Providence; everything glides on smoothly and noiselessly, and the work is fairly going on before men are aware that it has begun. Nor should the prophecy of Daniel be forgotten, touching the last ages of the world:—"Many shall go to and fro, and knowledge shall be increased;" clearly intimating that the thorough passage of the world (which now by so many distant voyages seems to be accomplished, or in course of accomplishment), and the advancement of the sciences, are destined by fate, that is, by Divine Providence, to meet in the same age.

### xciv

Next comes a consideration of the greatest importance as an argument of hope; I mean that drawn from the errors of past time, and of the ways hitherto trodden. For most excellent was the censure once passed upon a government that had been unwisely administered. "That which is the worst thing in reference to the past, ought to be regarded as best for the future. For if you had done all that your duty demanded, and yet your affairs were no better, you would not have even a hope left you that further improvement is possible. But now, when your misfortunes are owing, not to the force of circumstances, but to your own errors, you may hope that by dismissing or correcting these errors, a great change may be made for the better." In like manner, if during so long a course of years men had kept the true road for discovering and cultivating sciences, and had yet been unable to make further progress therein, bold doubtless and rash would be the opinion that further progress is possible. But if the road itself has been mistaken, and men's labor spent on unfit objects, it follows that the difficulty has its rise not in things themselves, which are not in our power, but in the human understanding, and the use and application thereof, which admits of remedy and medicine. It will be of great use therefore to set forth what these errors are; for as many impediments as there have been in times past from this cause, so many arguments are there of hope for the time to come. And although they have been partly touched before, I think fit here also, in plain and simple words, to represent them.

### XCV

Those who have handled sciences have been either men of experiment or men of dogmas. The men of experiment are like the ant; they only collect and use: the reasoners resemble spiders, who make cobwebs out of their own substance. But the bee takes a middle course, it gathers its material from the flowers of the garden and of the field, but transforms and digests it by a power of its own. Not unlike this is the true business of philosophy: for it neither relies solely or chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments and lay it up in the memory whole, as it finds it; but lays it up in the understanding altered and digested. Therefore from a closer and purer league between these two faculties, the experimental and the rational, (such as has never yet been made) much may be hoped.

### xcvi

We have as yet no natural philosophy that is pure; all is tainted and corrupted: in Aristotle's school by logic; in Plato's by natural theology; in the second school of Platonists, such as Proclus and others, by mathematics, which ought only to give definiteness to natural philosophy, not to generate or give it birth. From a natural philosophy pure and unmixed, better things are to be expected.

### xcvii

No one has yet been found so firm of mind and purpose as resolutely to compel himself to sweep away all theories and common notions, and to apply the understanding, thus made fair and even, to a fresh examination of particulars. Thus it happens that human knowledge, as we have it, is a mere medley and ill-digested mass, made up of much credulity and much accident, and also of the childish notions which we at first imbibed.

Now if anyone of ripe age, unimpaired senses, and well-purged mind, apply himself anew to experience and particulars, better hopes may be entertained of that man. In which point I promise to myself a like fortune to that of Alexander the Great; and let no man tax me with vanity till he have heard the end; for the thing which I mean tends to the putting off of all vanity. For of Alexander and his deeds Æschines spake thus: "Assuredly we do not live the life of mortal men; but to this end were we born, that in after ages wonders might be told of us;" as if what Alexander had done seemed to him miraculous. But in the next age Titus Livius took a better and a deeper view of the matter, saying in effect, that Alexander "had done no more than take courage to despise vain apprehensions." And a like judgment I suppose may be passed on myself in future ages: that I did no great things, but simply made less account of things that were accounted great. In the meanwhile, as I have already said, there is no hope except in a new birth of science; that is, in raising it regularly up from experience and building it afresh; which no one (I think) will say has yet been done or thought of.

### xcviii

Now for grounds of experience—since to experience we must come—we have as yet had either none or very weak ones; no search has been made to collect a store of particular observations sufficient either in number, or in kind, or in certainty, to inform the understanding, or in any way adequate. On the contrary, men of learning, but easy withal and idle, have taken for the construction or for the confirmation of their philosophy certain rumors and vague fames or airs of experience, and allowed to these the weight of lawful evidence. And just as if some kingdom or state were to direct its counsels and affairs, not by letters and reports from ambassadors and trustworthy messengers, but by the gossip of the streets; such exactly is the system of management introduced into philosophy with relation to experience. Nothing duly investigated, nothing verified, nothing counted, weighed, or measured, is to be found in natural history: and what in observation is loose and vague, is in information deceptive and treacherous. And if anyone thinks that this is a strange thing to say, and something like an unjust complaint, seeing that Aristotle, himself so great a man, and supported by the wealth of so great a king, has composed so accurate a history of animals; and that others with greater diligence, though less pretence, have made many additions; while others, again, have compiled copious histories and descriptions of metals, plants, and fossils; it seems that he does not rightly apprehend what it is that we are now about. For a natural history which is composed for its own sake is not like one that is collected to supply the understanding with information for the building up of philosophy. They differ in many ways, but especially in this; that the former contains the variety of natural species only, and not experiments of the mechanical arts. For even as in the business of life a man's disposition and the secret workings of his mind and affections are better discovered when he is in trouble than at other times; so likewise the secrets of nature reveal themselves more readily under the vexations of art than when they go their own way. Good hopes may therefore be conceived of natural philosophy, when natural history, which is the basis and foundation of it, has been drawn up on a better plan; but not till then.

### xcix

Again, even in the great plenty of mechanical experiments, there is yet a great scarcity of those which are of most use for the information of the understanding. For the mechanic, not troubling himself with the investigation of truth, confines his attention to those things which bear upon his particular work, and will not either raise his mind or stretch out his hand for anything else. But then only will there be good ground of hope for the further advance of knowledge, when there shall be received and gathered together into natural history a variety of experiments, which are of no use in themselves, but simply serve to discover causes and axioms; which I call *experimenta lucifera,* experiments of *light,* to distinguish them from those which I call *fructifera,* experiments of *fruit.*

Now experiments of this kind have one admirable property and condition; they never miss or fail. For since they are applied, not for the purpose of producing any particular effect, but only of discovering the natural cause of some effect, they answer the end equally well whichever way they turn out; for they settle the question.

### c

But not only is a greater abundance of experiments to be sought for and procured, and that too of a different kind from those hitherto tried; an entirely different method, order, and process for carrying on and advancing experience must also be introduced. For experience, when it wanders in its own track, is, as I have already remarked, mere groping in the dark, and confounds men rather than instructs them. But when it shall proceed in accordance with a fixed law, in regular order, and without interruption, then may better things be hoped of knowledge.

### ci

But even after such a store of natural history and experience as is required for the work of the understanding, or of philosophy, shall be ready at hand, still the understanding is by no means competent to deal with it off hand and by memory alone; no more than if a man should hope by force of memory to retain and make himself master of the computation of an ephemeris. And yet hitherto more has been done in matter of invention by thinking than by writing; and experience has not yet learned her letters. Now no course of invention can be satisfactory unless it be carried on in writing. But when this is brought into use, and experience has been taught to read and write, better things may be hoped.

### cii

Moreover, since there is so great a number and army of particulars, and that army so scattered and dispersed as to distract and confound the understanding, little is to be hoped for from the skirmishings and slight attacks and desultory movements of the intellect, unless all the particulars which pertain to the subject of inquiry shall, by means of Tables of Discovery, apt, well arranged, and as it were animate, be drawn up and marshaled; and the mind be set to work upon the helps duly prepared and digested which these tables supply.

### ciii

But after this store of particulars has been set out duly and in order before our eyes, we are not to pass at once to the investigation and discovery of new particulars or works; or at any rate if we do so we must not stop there. For although I do not deny that when all the experiments of all the arts shall have been collected and digested, and brought within one man's knowledge and judgment, the mere transferring of the experiments of one art to others may lead, by means of that experience which I term *literate,* to the discovery of many new things of service to the life and state of man; yet it is no great matter that can be hoped from that: but from the new light of axioms, which having been educed from those particulars by a certain method and rule, shall in their turn point out the way again to new particulars, greater things may be looked for. For our road does not lie on a level, but ascends and descends; first ascending to axioms, then descending to works.

### CIV

The understanding must not however be allowed to jump and fly from particulars to remote axioms and of almost the highest generality (such as the first principles, as they are called, of arts and things), and taking stand upon them as truths that cannot be shaken, proceed to prove and frame the middle axioms by reference to them: which has been the practice hitherto; the understanding being not only carried that way by a natural impulse, but also by the use of syllogistic demonstration trained and inured to it. But then, and then only, may we hope well of the sciences, when in a just scale of ascent, and by successive steps not interrupted or broken, we rise from particulars to lesser axioms; and then to middle axioms, one above the other; and last of all to the most general. For the lowest axioms differ but slightly from bare experience, while the highest and most general (which we now have) are notional and abstract and without solidity. But the middle are the true and solid and living axioms, on which depend the affairs and fortunes of men; and above them again, last of all, those which are indeed the most general,—such I mean as are not abstract, but of which those intermediate axioms are really limitations.

The understanding must not therefore be supplied with wings, but rather hung with weights, to keep it from leaping and flying. Now this has never yet been done; when it is done, we may entertain better hopes of the sciences.

### CV

In establishing axioms, another form of induction must be devised than has hitherto been employed; and it must be used for proving and discovering not first principles (as they are called) only, but also the lesser axioms, and the middle, and indeed all. For the induction which proceeds by simple enumeration is childish; its conclusions are precarious, and exposed to peril from a contradictory instance; and it generally decides on too small a number of facts, and on those only which are at hand. But the induction which is to be available for the discovery and demonstration of sciences and arts, must analyze nature by proper rejections and exclusions; and then, after a sufficient number of negatives, come to a conclusion on the affirmative instances: which has not yet been done or even attempted, save only by Plato, who does indeed employ this form of induction to a certain extent for the purpose of discussing definitions and ideas. But in order to furnish this induction or demonstration well and duly for its work, very many things are to be provided which no mortal has yet thought of; insomuch that greater labor will have to be spent in it than has hitherto been spent on the syllogism. And this induction must be used not only to discover axioms, but also in the formation of notions. And it is in this induction that our chief hope lies.

### CVI

But in establishing axioms by this kind of induction, we must also examine and try whether the axiom so established be framed to the measure of those particulars only from which it is derived, or whether it be larger and wider. And if it be larger and wider, we must observe whether by indicating to us new particulars it confirm that wideness and largeness as by a collateral security: that we may not either stick fast in things already known, or loosely grasp at shadows and abstract forms; not at things solid and realized in matter. And when this process shall have come into use, then at last shall we see the dawn of a solid hope.

### cvii

And here also should be remembered what was said above concerning the extending of the range of natural philosophy to take in the particular sciences, and the referring or bringing back of the particular sciences to natural philosophy; that the branches of knowledge may not be severed and cut off from the stem. For without this the hope of progress will not be so good.

### cviii

So much then for the removing of despair and the raising of hope through the dismissal or rectification of the errors of past time. We must now see what else there is to ground hope upon. And this consideration occurs at once—that if many useful discoveries have been made by accident or upon occasion, when men were not seeking for them but were busy about other things; no one can doubt but that when they apply themselves to seek and make this their business, and that too by method and in order and not by desultory impulses, they will discover far more. For although it may happen once or twice that a man shall stumble on a thing by accident which, when taking great pains to search for it, he could not find; yet upon the whole it unquestionably falls out the other way. And therefore far better things, and more of them, and at shorter intervals, are to be expected from man's reason and industry and direction and fixed application, than from accident and animal instinct and the like, in which inventions have hitherto had their origin.

### CIX

Another argument of hope may be drawn from this,—that some of the inventions already known are such as before they were discovered it could hardly have entered any man's head to think of; they would have been simply set aside as impossible. For in conjecturing what may be men set before them the example of what has been, and divine of the new with an imagination preoccupied and colored by the old; which way of forming opinions is very fallacious; for streams that are drawn from the springheads of nature do not always run in the old channels.

If, for instance, before the invention of ordnance, a man had described the thing by its effects, and said that there was a new invention, by means of which the strongest towers and walls could be shaken and thrown down at a great distance; men would doubtless have begun to think over all the ways of multiplying the force of catapults and mechanical engines by weights and wheels and such machinery for ramming and projecting: but the notion of a fiery blast suddenly and violently expanding and exploding would hardly have entered into any man's imagination or fancy; being a thing to which nothing immediately analogous had been seen, except perhaps in an earthquake or in lightning, which as *magnalia* or marvels of nature, and by man not imitable, would have been immediately rejected.

In the same way, if before the discovery of silk, anyone had said that there was a kind of thread discovered for the purposes of dress and furniture, which far surpassed the thread of linen or of wool in fineness and at the same time in strength, and also in beauty and softness; men would have begun immediately to think of some silky kind of vegetable, or of the finer hair of some animal, or of the feathers and down of birds; but of a web woven by a tiny worm, and that in such abundance, and renewing itself yearly, they would assuredly never have thought. Nay, if anyone had said anything about a worm, he would no doubt have been laughed at as dreaming of a new kind of cobwebs.

So again, if before the discovery of the magnet, any one had said that a certain instrument had been invented by means of which the quarters and points of the heavens could be taken and distinguished with exactness; men would have been carried by their imagination to a variety of conjectures concerning the more exquisite construction of astronomical instruments; but that anything could be discovered agreeing so well in its movements with the heavenly bodies, and yet not a heavenly body itself, but simply a substance of metal or stone, would have been judged altogether incredible. Yet these things and others like them lay for so many ages of the world concealed from men, nor was it by philosophy or the rational arts that they were found out at last, but by accident and occasion: being indeed, as I said, altogether different in kind and as remote as possible from anything that was known before; so that no preconceived notion could possibly have led to the discovery of them.

There is therefore much ground for hoping that there are still laid up in the womb of nature many secrets of excellent use, having no affinity or parallelism with anything that is now known, but lying entirely out of the beat of the imagination, which have not yet been found out. They too no doubt will some time or other, in the course and revolution of many ages, come to light of themselves, just as the others did; only by the method of which we are now treating they can be speedily and suddenly and simultaneously presented and anticipated.

### CX

But we have also discoveries to show of another kind, which prove that noble inventions may be lying at our very feet, and yet mankind may step over without seeing them. For however the discovery of gunpowder, of silk, of the magnet, of sugar, of paper, or the like, may seem to depend on certain properties of things themselves and nature, there is at any rate nothing in the art of printing which is not plain and obvious. Nevertheless for want of observing that although it is more difficult to arrange types of letters than to write letters by the motion of the hand, there is yet this difference between the two, that types once arranged serve for innumerable impressions, but letters written with the hand for a single copy only; or perhaps again for want of observing that ink can be so thickened as to color without running (particularly when the letters face upwards and the impression is made from above)—for want, I say, of observing these things, men went for so many ages without this most beautiful discovery, which is of so much service in the propagation of knowledge.

But such is the infelicity and unhappy disposition of the human mind in this course of invention, that it first distrusts and then despises itself: first will not believe that any such thing can be found out; and when it is found out, cannot understand how the world should have missed it so long. And this very thing may be justly taken as an argument of hope; namely, that there is a great mass of inventions still remaining, which not only by means of operations that are yet to be discovered, but also through the transferring, comparing, and applying of those already known, by the help of that learned experience of which I spoke, may be deduced and brought to light.

### cxi

There is another ground of hope that must not be omitted. Let men but think over their infinite expenditure of understanding, time, and means on matters and pursuits of far less use and value; whereof if but a small part were directed to sound and solid studies, there is no difficulty that might not be overcome. This I thought good to add, because I plainly confess that a collection of history natural and experimental, such as I conceive it and as it ought to be, is a great, I may say a royal work, and of much labor and expense.

### cxii

Meantime, let no man be alarmed at the multitude of particulars, but let this rather encourage him to hope. For the particular phenomena of art and nature are but a handful to the inventions of the wit, when disjoined and separated from the evidence of things. Moreover this road has an issue in the open ground and not far off; the other has no issue at all, but endless entanglement. For men hitherto have made but short stay with experience, but passing her lightly by, have wasted an infinity of time on meditations and glosses of the wit. But if someone were by that could answer our questions and tell us in each case what the fact in nature is, the discovery of all causes and sciences would be but the work of a few years.

### cxiii

Moreover I think that men may take some hope from my own example. And this I say not by way of boasting, but because it is useful to say it. If there be any that despond, let them look at me, that being of all men of my time the most busied in affairs of state, and a man of health not very strong (whereby much time is lost), and in this course altogether a pioneer, following in no man's track, nor sharing these counsels with any one, have nevertheless by resolutely entering on the true road, and submitting my mind to *things,* advanced these matters, as I suppose, some little way. And then let them consider what may be expected (after the way has been thus indicated) from men abounding in leisure, and from association of labors, and from successions of ages: the rather because it is not a way over which only one man can pass at a time (as is the case with that of reasoning), but one in which the labors and industries of men (especially as regards the collecting of experience) may with the best effect be first distributed and then combined. For then only will men begin to know their strength, when instead of great numbers doing all the same things, one shall take charge of one thing and another of another.

### cxiv

Lastly, even if the breath of hope which blows on us from that new continent were fainter than it is and harder to perceive; yet the trial (if we would not bear a spirit altogether abject) must by all means be made. For there is no comparison between that which we may lose by not trying and by not succeeding; since by not trying we throw away the chance of an immense good; by not succeeding we only incur the loss of a little human labor. But as it is, it appears to me from what has been said, and also from what has been left unsaid, that there is hope enough and to spare, not only to make a bold man try, but also to make a sober-minded and wise man believe.

### CXV

Concerning the grounds then for putting away despair, which has been one of the most powerful causes of delay and hindrance to the progress of knowledge, I have now spoken. And this also concludes what I had to say touching the *signs* and *causes* of the errors, sluggishness, and ignorance which have prevailed; especially since the more subtle causes, which do not fall under popular judgment and observation, must be referred to what has been said on the idols of the human mind.

And here likewise should close that part of my *Instauration,* which is devoted to pulling down: which part is performed by three refutations; first, by the refutation of the *natural human reason,* left to itself; secondly, by the refutation of the *demonstrations;* and thirdly, by the refutation of the *theories,* or the received systems of philosophy and doctrine. And the refutation of these has been such, as alone it could be; that is to say, by signs and the evidence of causes; since no other kind of confutation was open to me, differing as I do from others both on first principles and on rules of demonstration. . . .

[In Aphorisms cxvi to cxxviii Bacon takes up certain misapprehensions and difficulties which may occur to the reader.

First, it must not be supposed that "after the fashion of ancient Greeks, and of certain moderns, as Telesius, Patricius, Severinus," that he wants "to found a new sect in philosophy." Bacon does not wish to trouble himself "with any such speculative and withal unprofitable matters," he has "no entire or universal theory to propound"; on the contrary, his purpose is to try whether he "cannot in very fact lay more firmly the foundations, and extend more widely the limits, of the power and greatness of man." Nor does he "hold out offers or promises of particular works." His course is to devise a legitimate method of interpreting nature from which causes and axioms may be educed that may in their turn be used to effect works. In this task a mere beginning has been made. No doubt his history and tables of discovery contain some things that are uncertain or even false, "but this is of no consequence; for such things must needs happen at first." The essence of the method is that it is self-corrective. Again, men's interest may be averted and alienated because his history and experiments often treat of things which are trivial or commonly known, or are mean and low, or are too subtle and merely speculative, and seem to be of no use. But Bacon is "seeking for experiments of light, not for experiments of fruit." His object is to gain, from whatever source, a knowledge of "simple natures." It is false, therefore, to suppose that things like these are of no use. Just as the letters of the alphabet have no use or meaning in themselves, yet "are the subject-matter for the composition and apparatus of all discourse," so the knowledge of simple natures "gives entrance to all the secrets of nature's workshop, and virtually includes and draws after it whole bands and troops of works, and opens to us the sources of the noblest axioms; and yet in itself is of no great use." Nor should it be thought "a strange and harsh thing" that he has set aside all received authority. To have adduced authority for his conclusions would have been an easy thing, but "new discoveries must be sought out from the light of nature, not fetched back out of the darkness of antiquity." The new science relies not on the wisdom of the few, but on the cogency of its method. "For my way of discovering sciences goes far to level men's wits, and leaves but little to individual excellence; because it performs everything by the surest rules and demonstrations." Again, it must not be supposed that, because of the emphasis on works, truth is here rendered subservient to utility: "For I am building in the human understanding a true model of the world, such as it is in fact, not such as man's own reason would have it to be; a thing which cannot be done without a very diligent dissection and anatomy of the world . . . Truth, therefore, and utility are here the very same things: and works themselves are of greater value as pledges of truth than as contributing to the comforts of life." The new method differs from those of the ancients in that it does not leap at once from a few scattered examples and particulars, by means of received notions, to the most general conclusions, but proceeds gradually, in order and with the greatest care, from particulars through all intermediate steps to the highest generalities. It must not be supposed, however, that this suspension of judgment entails "a denial of the capacity of the mind to comprehend truth"; instead, the intention is not to "slight the understanding, but improve it." Nor is the method intended to apply to the natural sciences alone; it is a general method: all of the other sciences, logic, ethics and politics, should be treated inductively. Finally, Bacon has no desire to "pull down and destroy the philosophy and arts and sciences which are at present in use"; but he gives "constant and distinct warning that by the methods now in use neither can any great progress be made in the doctrines and contemplative part of sciences, nor can they be carried out to any magnitude of works."]

## cxxix

It remains for me to say a few words touching the excellency of the end in view. Had they been uttered earlier, they might have seemed like idle wishes; but now that hopes have been raised and unfair prejudices removed, they may perhaps have greater weight. Also, if I had finished all myself, and had no occasion to call in others to help and take part in the work, I should even now have abstained from such language, lest it might be taken as a proclamation of my own deserts. But since I want to quicken the industry and rouse and kindle the zeal of others, it is fitting that I put men in mind of some things.

In the first place then, the introduction of famous discoveries appears to hold by far the first place among human actions; and this was the judgment of the former ages. For to the authors of inventions they awarded divine honors; while to those who did good service in the state (such as founders of cities and empires, legislators, saviors of their country from long endured evils, quellers of tyrannies, and the like) they decreed no higher honors than heroic. And certainly if a man rightly compare the two, he will find that this judgment of antiquity was just. For the benefits of discoveries may extend to the whole race of man, civil benefits only to particular places; the latter last not beyond a few ages, the former through all time. Moreover the reformation of a state in civil matters is seldom brought in without violence and confusion; but discoveries carry blessings with them, and confer benefits without causing harm or sorrow to any.

Again, discoveries are as it were new creations, and imitations of God's works; as well sang the poet:—

> To man's frail race great Athens long ago
> First gave the seed whence waving harvests grow,
> And *re-created* all our life below.

And it appears worthy of remark in Solomon, that though mighty in empire and in gold; in the magnificence of his works, his court, his household, and his fleet; in the luster of his name and the worship of mankind: yet he took none of these to glory in, but pronounced that "The glory of God is to conceal a thing; the glory of the king to search it out."

Again, let a man only consider what a difference there is between the life of men in the most civilized province of Europe, and in the wildest and most barbarous districts of New India; he will feel it be great enough to justify the saying that "man is a god to man," not only in regard of aid and benefit, but also by a comparison of condition. And this difference comes not from soil, not from climate, not from race, but from the arts.

Again, it is well to observe the force and virtue and consequences of discoveries; and these are to be seen nowhere more conspicuously than in those three which were unknown to the ancients, and of which the origin, though recent, is obscure and inglorious; namely, printing, gunpowder, and the magnet. For these three have changed the whole face and state of things throughout the world; the first in literature, the second in warfare, the third in navigation; whence have followed innumerable changes; insomuch that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries.

Further, it will not be amiss to distinguish the three kinds and as it were grades of ambition in mankind. The first is of those who desire to extend their own power in their native country; which kind is vulgar and degenerate. The second is of those who labor to extend the power of their country and its dominion among men. This certainly has more dignity, though not less covetousness. But if a man endeavor to establish and extend the power and dominion of the human race itself over the universe, his ambition (if ambition it can be called) is without doubt both a more wholesome thing and a more noble than the other two. Now the empire of man over things depends wholly on the arts and sciences. For we cannot command nature except by obeying her.

Again, if men have thought so much of some one particular discovery as to regard him as more than man who has been able by some benefit to make the whole human race his debtor, how much higher a thing to discover that by means of which all things else shall be discovered with ease! And yet (to speak the whole truth), as the uses of light are infinite, in enabling us to walk, to ply our arts, to read, to recognize one another; and nevertheless the very beholding of the light is itself a more excellent and a fairer thing than all the uses of it;—so assuredly the very contemplation of things, as they are, without superstition or imposture, error or confusion, is in itself more worthy than all the fruit of inventions.

Lastly, if the debasement of arts and sciences to purposes of wickedness, luxury, and the like, be made a ground of objection, let no one be moved thereby. For the same may be said of all earthly goods; of wit, courage, strength, beauty, wealth, light itself, and the rest. Only let the human race recover the right over nature which belongs to it by divine bequest, and let power be given it; the exercise thereof will be governed by sound reason and true religion.

## CXXX

And now it is time for me to propound the art itself of interpreting nature; in which, although I conceive that I have given true and most useful precepts, yet I do not say either that it is absolutely necessary (as if nothing could be done without it) or that it is perfect. For I am of opinion that if men had ready at hand a just history of nature and experience, and labored diligently thereon; and if they could bind themselves to two rules,—the first, to lay aside received opinions and notions; and the second, to refrain the mind for a time from the highest generalizations, and those next to them, —they would be able by the native and genuine force of the mind, without any other art, to fall into my form of interpretation. For interpretation is the true and natural work of the mind when freed from impediments. It is true however that by my precepts everything will be in more readiness, and much more sure.

Nor again do I mean to say that no improvement can be made upon these. On the contrary, I that regard the mind not only in its own faculties but in its connection with things, must needs hold that the art of discovery may advance as discoveries advance.

# THE SECOND BOOK OF
# APHORISMS
# CONCERNING
# THE INTERPRETATION OF NATURE
# AND
# THE KINGDOM OF MAN

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## Aphorism

### i

On a given body to generate and superinduce a new nature or new natures, is the work and aim of *human power.* Of a given nature to discover the form, or true specific difference, or nature-engendering nature, or source of emanation (for these are the terms which come nearest to a description of the thing), is the work and aim of *human knowledge.* Subordinate to these primary works are two others that are secondary and of inferior mark: to the former, the transformation of concrete bodies, so far as this is possible; to the latter, the discovery, in every case of generation and motion, of the Latent Process carried on from the manifest efficient and the manifest material to the form which is engendered; and in like manner the discovery of the Latent Configuration of bodies at rest and not in motion.

### ii

In what an ill condition human knowledge is at the present time, is apparent even from the commonly received maxims. It is a correct position that "true knowledge is knowledge by causes." And causes again are not improperly distributed into four kinds: the material, the formal, the efficient, and the final. But of these the final cause rather corrupts than advances the sciences, except such as have to do with human action. The discovery of the formal is despaired of. The efficient and the material (as they are investigated and received, that is, as remote causes, without reference to the latent process leading to the form) are but slight and superficial, and contribute little, if anything, to true and active science. Nor have I forgotten that in a former passage I noted and corrected as an error of the human mind the opinion that Forms give existence. For though in nature nothing really exists beside individual bodies, performing pure individual acts according to a fixed law, yet in philosophy this very law, and the investigation, discovery, and explanation of it, is the foundation as well of knowledge as of operation. And it is this law, with its clauses, that I mean when I speak of *Forms;* a name which I the rather adopt because it has grown into use and become familiar.

### iii

If a man be acquainted with the cause of any nature (as whiteness or heat) in certain subjects only, his knowledge is imperfect; and if he be able to superinduce an effect on certain substances only (of those susceptible of such effect), his power is in like manner imperfect. Now if a man's knowledge be confined to the efficient and material causes (which are unstable causes, and merely vehicles, or causes which convey the form in certain cases), he may arrive at new discoveries in reference to substances in some degree similar to one another, and selected beforehand; but he does not touch the deeper boundaries of things. But whosoever is acquainted with Forms, embraces the unity of nature in substances the most unlike; and is able therefore to detect and bring to light things never yet done, and such as neither the vicissitudes of nature, nor industry in experimenting, nor accident itself, would ever have brought into act, and which would never have occurred to the thought of man. From the discovery of Forms therefore results truth in speculation and freedom in operation.

iv

Although the roads to human power and to human knowledge lie close together, and are nearly the same, nevertheless on account of the pernicious and inveterate habit of dwelling on abstractions, it is safer to begin and raise the sciences from those foundations which have relation to practice, and to let the active part itself be as the seal which prints and determines the contemplative counterpart. We must therefore consider, if a man wanted to generate and superinduce any nature upon a given body, what kind of rule or direction or guidance he would most wish for, and express the same in the simplest and least abstruse language. For instance, if a man wishes to superinduce upon silver the yellow color of gold, or an increase of weight (observing the laws of matter), or transparency on an opaque stone, or tenacity on glass, or vegetation on some substance that is not vegetable,—we must consider, I say, what kind of rule or guidance he would most desire. And in the first place, he will undoubtedly wish to be directed to something which will not deceive him in the result, nor fail him in the trial. Secondly, he will wish for such a rule as shall not tie him down to certain means and particular modes of operation. For perhaps he may not have those means, nor be able conveniently to procure them. And if there be other means and other methods for producing the required nature (beside the one prescribed) these may perhaps be within his reach; and yet he shall be excluded by the narrowness of the rule, and get no good from them. Thirdly, he will desire something to be shown him which is not as difficult as the thing proposed to be done, but comes nearer to practice.

For a true and perfect rule of operation then the direction will be *that it be certain, free, and disposing or leading to action.* And this is the same thing with the discovery of the true Form. For the Form of a nature is such that, given the Form, the nature infallibly follows. Therefore it is always present when the nature is present, and universally implies it, and is constantly inherent in it. Again, the Form is such that if it be taken away, the nature infallibly vanishes. Therefore it is always absent when the nature is absent, and implies its absence, and inheres in nothing else. Lastly, the true Form is such that it deduces the given nature from some source of being which is inherent in more natures, and which is better known in the natural order of things than the Form itself. For a true and perfect axiom of knowledge then the direction and precept will be, *that another nature be discovered which is convertible with the given nature, and yet is a limitation of a more general nature, as of a true and real genus.* Now these two directions, the one active the other contemplative, are one and the same thing; and what in operation is most useful, that in knowledge is most true.

## V

The rule or axiom for the transformation of bodies is of two kinds. The first regards a body as a troop or collection of simple natures. In gold, for example, the following properties meet. It is yellow in color; heavy up to a certain weight; malleable or ductile to a certain degree of extension; it is not volatile, and loses none of its substance by the action of fire; it turns into a liquid with a certain degree of fluidity; it is separated and dissolved by particular means; and so on for the other natures which meet in gold. This kind of axiom, therefore, deduces the thing from the forms of simple natures. For he who knows the forms of yellow, weight, ductility, fixity, fluidity, solution, and so on, and the methods for superinducing them, and their gradations and modes, will make it his care to have them joined together in some body, whence may follow the transformation of that body into gold. And this kind of operation pertains to the first kind of action. For the principle of generating some one simple nature is the same as that of generating many; only that a man is more fettered and tied down in operation if more are required, by reason of the difficulty of combining into one so many natures, which do not readily meet except in the beaten and ordinary paths of nature. It must be said however that this mode of operation (which looks to simple natures though in a compound body) proceeds from what in nature is constant and eternal and universal, and opens broad roads to human power, such as (in the present state of things) human thought can scarcely comprehend or anticipate.

The second kind of axiom, which is concerned with the discovery of the Latent Process, proceeds not by simple natures, but by compound bodies, as they are found in nature in its ordinary course. As, for instance, when inquiry is made, from what beginnings, and by what method and by what process, gold or any other metal or stone is generated, from its first menstrua and rudiments up to the perfect mineral; or in like manner by what process herbs are generated, from the first concretion of juices in the ground or from seeds up to the formed plant, with all the successive motions and diverse and continued efforts of nature. So also in the inquiry concerning the process of development in the generation of animals, from coition to birth; and in like manner of other bodies.

It is not however only to the generations of bodies that this investigation extends, but also to other motions and operations of nature. As, for instance, when inquiry is made concerning the whole course and continued action of nutrition, from the first reception of the food to its complete assimilation; or again, concerning the voluntary motion of animals, from the first impression on the imagination and the continued efforts of the spirit up to the bendings and movements of the limbs; or concerning the motion of the tongue and lips and other instruments, and the changes through which it passes till it comes to the utterance of articulate sounds. For these inquiries also relate to natures concrete or combined into one structure, and have regard to what may be called particular and special habits of nature, not to her fundamental and universal laws which constitute Forms. And yet it must be confessed that this plan appears to be readier and to lie nearer at hand and to give more ground for hope than the primary one.

In like manner the operative which answers to this speculative part, starting from the ordinary incidents of nature, extends its operation to things immediately adjoining, or at least not far removed. But as for any profound and radical operations on nature, they depend entirely on the primary axioms. And in those things too where man has no means of operating, but only of knowing, as in the heavenly bodies (for these he cannot operate upon or change or transform), the investigation of the fact itself or truth of the thing, no less than the knowledge of the causes and consents, must come from those primary and catholic axioms concerning simple natures; such as the nature of spontaneous rotation, of attraction or magnetism, and of many others which are of a more general form than the heavenly bodies themselves. For let no one hope to decide the question whether it is the earth or heaven that really revolves in the diurnal motion, until he has first comprehended the nature of spontaneous rotation.

## vi

But this Latent Process, of which I speak, is quite another thing than men, preoccupied as their minds now are, will easily conceive. For what I understand by it is not certain measures or signs or successive steps of process in bodies, which can be seen; but a process perfectly continuous, which for the most part escapes the sense.

For instance: in all generation and transformation of bodies, we must inquire what is lost and escapes; what remains, what is added; what is expanded, what contracted; what is united, what separated; what is continued, what cut off; what propels, what hinders; what predominates, what yields; and a variety of other particulars.

Again, not only in the generation or transformation of bodies are these points to be ascertained, but also in all other alterations and motions it should in like manner be inquired what goes before, what comes after; what is quicker, what more tardy; what produces, what governs motion; and like points; all which nevertheless in the present state of the sciences (the texture of which is as rude as possible and good for nothing) are unknown and unhandled. For seeing that every natural action depends on things infinitely small, or at least too small to strike the sense, no one can hope to govern or change nature until he has duly comprehended and observed them.

### vii

In like manner the investigation and discovery of the Latent Configuration in bodies is a new thing, no less than the discovery of the Latent Process and of the Form. For as yet we are but lingering in the outer courts of nature, nor are we preparing ourselves a way into her inner chambers. Yet no one can endow a given body with a new nature, or successfully and aptly transmute it into a new body, unless he has attained a competent knowledge of the body so to be altered or transformed. Otherwise he will run into methods which, if not useless, are at any rate difficult and perverse and unsuitable to the nature of the body on which he is operating. It is clear therefore that to this also a way must be opened and laid out.

And it is true that upon the anatomy of organised bodies (as of man and animals) some pains have been well bestowed and with good effect; and a subtle thing it seems to be, and a good scrutiny of nature. Yet this kind of anatomy is subject to sight and sense, and has place only in organised bodies. And besides it is a thing obvious and easy, when compared with the true anatomy of the Latent Configuration in bodies which are thought to be of uniform structure: especially in things that have a specific character and their parts, as iron, stone; and again in parts of uniform structure in plants and animals, as the root, the leaf, the flower, flesh, blood, and bones. But even in this kind, human industry has not been altogether wanting; for this is the very thing aimed at in the separation of bodies of uniform structure by means of distillations and other modes of analysis,—that the complex structure of the compound may be made apparent by bringing together its several homogeneous parts. And this is of use too, and conduces to the object we are seeking; although too often fallacious in its results, because many natures which are in fact newly brought out and superinduced by fire and heat and other modes of solution are taken to be the effect of separation merely, and to have subsisted in the compound before. And after all, this is but a small part of the work of discovering the true configuration in the compound body; which configuration is a thing far more subtle and exact, and such as the operation of fire rather confounds than brings out and makes distinct.

Therefore a separation and solution of bodies must be effected, not by fire indeed, but by reasoning and true induction, with experiments to aid; and by a comparison with other bodies, and a reduction to simple natures and their Forms, which meet and mix in the compound. In a word we must pass from Vulcan to Minerva, if we intend to bring to light the true textures and configurations of bodies; on which all the occult and, as they are called, specific properties and virtues in things depend; and from which too the rule of every powerful alteration and transformation is derived.

For example, we must inquire what amount of spirit there is in every body, what of tangible essence; and of the spirit, whether it be copious and turgid, or meagre and scarce; whether it be fine or coarse, akin to air or to fire, brisk or sluggish, weak or strong, progressive or retrograde, interrupted or continuous, agreeing with external and surrounding objects or disagreeing, etc. In like manner we must inquire into the tangible essence (which admits of no fewer differences than the spirit),—into its coats, its fibres, its kinds of texture. Moreover the disposition of the spirit throughout the corporeal frame, with its pores, passages, veins and cells, and the rudiments or first essays of the organised body, fall under the same investigation. But on these inquiries also, and I may say on all the discovery of the Latent Configuration, a true and clear light is shed by the primary axioms, which entirely dispels all darkness and subtlety.

### viii

Nor shall we thus be led to the doctrine of atoms, which implies the hypothesis of a vacuum and that of the unchangeableness of matter (both false assumptions); we shall be led only to real particles, such as really exist. Nor again is there any reason to be alarmed at the subtlety of the investigation, as if it could not be disentangled: on the contrary, the nearer it approaches to simple natures, the easier and plainer will everything become; the business being transferred from the complicated to the simple, from the incommensurable to the commensurable, from surds to rational quantities, from the infinite and vague to the finite and certain,—as in the case of the letters of the alphabet and the notes of music. And inquiries into nature have the best result when they begin with physics and end in mathematics. Again, let no one be afraid of high numbers or minute fractions. For in dealing with numbers it is as easy to set down or conceive a thousand as one, or the thousandth part of an integer as an integer itself.

### ix

From the two kinds of axioms which have been spoken of, arises a just division of philosophy and the sciences; taking the received terms (which come nearest to express the thing) in a sense agreeable to my own views. Thus, let the investigation of Forms, which are (in the eye of reason at least, and in their essential law) eternal and immutable, constitute *metaphysics;* and let the investigation of the Efficient Cause, and of Matter, and of the Latent Process, and the Latent Configuration (all of which have reference to the common and ordinary course of nature, not to her eternal and fundamental laws) constitute *physics.* And to these let there be subordinate two practical divisions: to physics, *mechanics;* to metaphysics, what (in a purer sense of the word) I call *magic,* on account of the broadness of the ways it moves in, and its greater command over nature.

## x

Having thus set up the mark of knowledge, we must go on to precepts, and that in the most direct and obvious order. Now my directions for the interpretation of nature embrace two generic divisions: the one how to educe and form axioms from experience; the other how to deduce and derive new experiments from axioms. The former again is divided into three ministrations: a ministration to the sense, a ministration to the memory, and a ministration to the mind or reason.

For first of all we must prepare a *Natural and Experimental History,* sufficient and good; and this is the foundation of all; for we are not to imagine or suppose, but to discover, what nature does or may be made to do.

But natural and experimental history is so various and diffuse, that it confounds and distracts the understanding, unless it be ranged and presented to view in a suitable order. We must therefore form *Tables and Arrangements of Instances,* in such a method and order that the understanding may be able to deal with them.

And even when this is done, still the understanding, if left to itself and its own spontaneous movements, is incompetent and unfit to form axioms, unless it be directed and guarded. Therefore in the third place we must use *Induction,* true and legitimate induction, which is the very key of interpretation. But of this, which is the last, I must speak first, and then go back to the other ministrations.

## xi

The investigation of Forms proceeds thus: a nature being given, we must first of all have a muster or presentation before the understanding of all known instances which agree in the same nature, though in substances the most unlike. And such collection must be made in the manner of a history, without premature speculation, or any great amount of subtlety. For example, let the investigation be into the Form of heat.

### *Instances Agreeing in the Nature of Heat*

1. The rays of the sun, especially in summer and at noon.
2. The rays of the sun reflected and condensed, as between mountains, or on walls, and most of all in burning-glasses and mirrors.
3. Fiery meteors.
4. Burning thunderbolts.
5. Eruptions of flame from the cavities of mountains.
6. All flame. . . .

[Bacon lists, in all, twenty-seven sets of instances in this *Table of Essence and Presence.*]

### xii

Secondly, we must make a presentation to the understanding of instances in which the given nature is wanting; because the Form, as stated above, ought no less to be absent when the given nature is absent, than present when it is present. But to note all these would be endless.

The negatives should therefore be subjoined to the affirmatives, and the absence of the given nature inquired of in those subjects only that are most akin to the others in which it is present and forthcoming. This I call the *Table of Deviation, or of Absence in Proximity.*

### *Instances in Proximity where the Nature of Heat is Absent*

1. The rays of the moon and of stars and comets are not found to be hot to the touch; indeed the severest colds are observed to be at the full moons.

The larger fixed stars however, when passed or approached by the sun, are supposed to increase and give intensity to the heat of the sun; as is the case when the sun is in the sign Leo, and in the Dog-days.

2. The rays of the sun in what is called the middle region of the air do not give heat; for which there is commonly assigned not a bad reason, viz. that that region is neither near enough to the body of the sun from which the rays emanate, nor to the earth from which they are reflected. And this appears from the fact that on the tops of mountains, unless they are very high, there is perpetual snow. On the other hand it has been observed that on the peak of Teneriffe, and among the Andes of Peru, the very tops of the mountains are free from snow; which lies only somewhat lower down. Moreover the air itself at the very top is found to be by no means cold, but only rare and keen; insomuch that on the Andes it pricks and hurts the eyes by its excessive keenness, and also irritates the mouth of the stomach, producing vomiting. And it was observed by the ancients that on the top of Olympus the rarity of the air was such that those who ascended it had to carry sponges with them dipped in vinegar and water, and to apply them from time to time to their mouth and nose, the air being from its rarity not sufficient to support respiration; and it was further stated that on this summit the air was so serene, and so free from rain and snow and wind, that letters traced by the finger in the ashes of the sacrifices on the altar of Jupiter remained there till the next year without being at all disturbed. And at this day travellers ascending to the top of the Peak of Teneriffe make the ascent by night and not by day; and soon after the rising of the sun are warned and urged by their guides to come down without delay, on account of the danger they run lest the animal spirits should swoon and be suffocated by the tenuity of the air. . . .

[Bacon cites thirty-two cases of such *Instances in Proximity.*]

## xiii

Thirdly, we must make a presentation to the understanding of instances in which the nature under inquiry is found in different degrees, more or less; which must be done by making a comparison either of its increase and decrease in the same subject, or of its amount in different subjects, as compared one with another. For since the Form of a thing is the very thing itself, and the thing differs from the Form no otherwise than as the apparent differs from the real, or the external from the internal, or the thing in reference to man from the thing in reference to the universe; it necessarily follows that no nature can be taken as the true Form, unless it always decrease when the nature in question decreases, and in like manner always increase when the nature in question increases. This table therefore I call the *Table of Degrees* or the *Table of Comparison.*

### *Table of Degrees or Comparison in Heat*

I will therefore first speak of those substances which contain no degree at all of heat perceptible to the touch, but seem to have a certain potential heat only, or disposition and preparation for hotness. After that I shall proceed to substances which are hot actually, and to the touch, and to their intensities and degrees.

1. In solid and tangible bodies we find nothing which is in its nature originally hot. For no stone, metal, sulphur, fossil, wood, water, or carcass of animal is found to be hot. And the hot water in baths seems to be heated by external causes; whether it be by flame or subterraneous fire, such as is thrown up from Ætna and many other mountains, or by the conflict of bodies, as heat is caused in the dissolutions of iron and tin. There is therefore no degree of heat palpable to the touch in animate substances; but they differ in degree of cold, wood not being equally cold with metal. But this belongs to the Table of Degrees in Cold.

2. As far however as potential heat and aptitude for flame is concerned, there are many inanimate substances found strongly disposed thereto, as sulphur, naphtha, rock oil. . . .

[He gives forty-one cases in the *Table of Degrees.*]

## xiv

How poor we are in history any one may see from the foregoing tables; where I not only insert sometimes mere traditions and reports (though never without a note of doubtful credit and authority) in place of history proved and instances certain, but am also frequently forced to use the words "Let trial be made," or "Let it be further inquired."

## xv

The work and office of these three tables I call the Presentation of Instances to the Understanding. Which presentation having been made, Induction itself must be set at work; for the problem is, upon a review of the instances, all and each, to find such a nature as is always present or absent with the given nature, and always increases and decreases with it; and which is, as I have said, a particular case of a more general nature. Now if the mind attempt this affirmatively from the first, as when left to itself it is always wont to do, the result will be fancies and guesses and notions ill defined and axioms that must be mended every day; unless like the schoolmen we have a mind to fight for what is false; though doubtless these will be better or worse according to the faculties and strength of the understanding which is at work. To God, truly, the Giver and Architect of Forms, and it may be to the angels and higher intelligences, it belongs to have an affirmative knowledge of Forms immediately, and from the first contemplation. But this assuredly is more than man can do, to whom it is granted only to proceed at first by negatives, and at last to end in affirmatives, after exclusion has been exhausted.

## xvi

We must make therefore a complete solution and separation of nature, not indeed by fire, but by the mind, which is a kind of divine fire. The first work therefore of true induction (as far as regards the discovery of Forms) is the rejection or exclusion of the several natures which are not found in some instance where the given nature is present, or are found in some instance where the given nature is absent, or are found to increase in some instance when the given nature decreases, or to decrease when the given nature increases. Then indeed after the rejection and exclusion has been duly made, there will remain at the bottom, all light opinions vanishing into smoke, a Form affirmative, solid and true and well defined. This is quickly said; but the way to come at it is winding and intricate. I will endeavor however not to overlook any of the points which may help us towards it.

### xvii

But when I assign so prominent a part to Forms, I cannot too often warn and admonish men against applying what I say to those forms to which their thoughts and contemplations have hitherto been accustomed.

For in the first place I do not at present speak of Compound Forms, which are, as I have remarked, combinations of simple natures according to the common course of the universe; as of the lion, eagle, rose, gold, and the like. It will be time to treat of these when we come to the Latent Processes and Latent Configurations, and the discovery of them, as they are found in what are called substances or natures concrete.

And even in the case of simple natures I would not be understood to speak of abstract Forms and Ideas, either not defined in matter at all, or ill defined. For when I speak of Forms, I mean nothing more than those laws and determinations of absolute actuality, which govern and constitute any simple nature, as heat, light, weight, in every kind of matter and subject that is susceptible of them. Thus the Form of heat or the Form of light is the same thing as the Law of heat or the Law of light. Nor indeed do I ever allow myself to be drawn away from things themselves and the operative part. And therefore when I say (for instance) in the investigation of the Form of heat, "Reject rarity," or "Rarity does not belong to the form of heat;" it is the same as if I said, "It is possible to superinduce heat on a dense body," or "It is possible to take away or keep out heat from a rare body."

But if anyone conceive that my Forms too are of a somewhat abstract nature, because they mix and combine things heterogeneous (for the heat of heavenly bodies and the heat of fire seem to be very heterogeneous; so do the fixed red of the rose or the like, and the apparent red in the rainbow, the opal, or the diamond; so again do the different kinds of death, death by drowning, by hanging, by stabbing, by apoplexy, by atrophy; and yet they agree severally in the nature of heat, redness, death); if anyone, I say, be of this opinion, he may be assured that his mind is held in captivity by custom, by the gross appearance of things, and by men's opinions. For it is most certain that these things, however heterogeneous and alien from each other, agree in the Form or Law which governs heat, redness and death; and that the power of man cannot possibly be emancipated and freed from the common course of nature, and expanded and exalted to new efficients and new modes of operation, except by the revelation and discovery of Forms of this kind. And yet, when I have spoken of this union of nature, which is the point of most importance, I shall proceed to the divisions and veins of nature, as well the ordinary as those that are more inward and exact, and speak of them in their place.

## xviii

I must now give an example of the Exclusion or Rejection of natures which by the Tables of Presentation are found not to belong to the Form of heat; observing in the meantime that not only each table suffices for the rejection of any nature, but even any one of the particular instances contained in any of the tables. For it is manifest from what has been said that any one contradictory instance overthrows a conjecture as to the Form. But nevertheless for clearness' sake and that the use of the tables may be more plainly shown, I sometimes double or multiply an exclusion.

### *An Example of Exclusion, or Rejection of Natures from the Form of Heat*

1. On account of the rays of the sun, reject the nature of the elements.

2. On account of common fire, and chiefly subterraneous fires (which are the most remote and most completely separate from the rays of heavenly bodies), reject the nature of heavenly bodies.

3. On account of the warmth acquired by all kinds of bodies (minerals, vegetables, skin of animals, water, oil, air, and the rest) by mere approach to a fire, or other hot body, reject the distinctive or more subtle texture of bodies. . . .

[In all, fourteen rejections of natures are given.]

There are other natures beside these; for these tables are not perfect, but meant only for examples.

All and each of the above mentioned natures do *not* belong to the Form of heat. And from all of them man is freed in his operations on heat.

### xix

In the process of Exclusion are laid the foundations of true Induction, which however is not completed till it arrives at an Affirmative. Nor is the Exclusive part itself at all complete, nor indeed can it possibly be so at first. For Exclusion is evidently the rejection of simple natures; and if we do not yet possess sound and true notions of simple natures, how can the process of Exclusion be made accurate? Now some of the above-mentioned notions (as that of the nature of the elements, of the nature of heavenly bodies, of rarity) are vague and ill-defined. I therefore, well knowing and nowise forgetting how great a work I am about (viz. that of rendering the human understanding a match for things and nature), do not rest satisfied with the precepts I have laid down; but proceed further to devise and supply more powerful aids for the use of the understanding; which I shall now subjoin. And assuredly in the Interpretation of Nature the mind should by all means be so prepared and disposed, that while it rests and finds footing in due stages and degrees of certainty, it may remember withal (especially at the beginning) that what it has before it depends in great measure upon what remains behind.

### XX

And yet since truth will sooner come out from error than from confusion, I think it expedient that the understanding should have permission, after the three Tables of First Presentation (such as I have exhibited) have been made and weighed, to make an essay of the Interpretation of Nature in the affirmative way; on the strength both of the instances given in the tables, and of any others it may meet with elsewhere. Which kind of essay I call the *indulgence of the understanding,* or the *commencement of interpretation,* or the *First Vintage.*

### *First Vintage concerning the Form of Heat*

It is to be observed that the Form of a thing is to be found (as plainly appears from what has been said) in each and all the instances, in which the thing itself is to be found; otherwise it would not be the Form. It follows therefore that there can be no contradictory instance. At the same time the Form is found much more conspicuous and evident in some instances than in others; namely in those wherein the nature of the Form is less restrained and obstructed and kept within bounds by other natures. Instances of this kind I call *Shining or Striking Instances.* Let us now therefore proceed to the First Vintage concerning the Form of Heat. . . .

[From an analytical comparison of the Tables Bacon now draws the working hypothesis as to the nature of heat which follows.]

Let this then be the First Vintage, or commencement of interpretation, concerning the Form of heat, made by way of indulgence to the understanding.

Now from this our First Vintage it follows that the Form or true definition of heat (heat, that is, in relation to the universe, not simply in relation to man) is in few words as follows: *Heat is a motion, expansive, restrained, and acting in its strife upon the smaller particles of bodies.* But the expansion is thus modified: *while it expands all ways, it has at the same time an inclination upwards.* And the struggle in the particles is modified also: *it is not sluggish, but hurried and with violence.*

Viewed with reference to operation it is the same thing. For the direction is this: *If in any natural body you can excite a dilating or expanding motion, and can so repress this motion and turn it back upon itself, that the dilation shall not proceed equably, but have its way in one part and be counteracted in another, you will undoubtedly generate heat;*—without taking into account whether the body be elementary (as it is called) or subject to celestial influence; whether it be luminous or opaque; rare or dense; locally expanded or confined within the bounds of its first dimension; verging to dissolution or remaining in its original state; animal, vegetable, or mineral, water, oil or air, or any other substance whatever susceptible of the above-mentioned motion. Sensible heat is the same thing; only it must be considered with reference to the sense. Let us now proceed to further aids.

## XXI

The Tables of First Presentation and the Rejection or process of Exclusion being completed, and also the First Vintage being made thereupon, we are to proceed to the other helps of the understanding in the Interpretation of Nature and true and perfect Induction. In propounding which, I mean, when Tables are necessary, to proceed upon the Instances of Heat and Cold; but when a small number of examples will suffice, I shall proceed at large; so that the inquiry may be kept clear, and yet more room be left for the exposition of the system.

I propose to treat then in the first place of *Prerogative Instances;* secondly, of the *Supports of Induction;* thirdly, of the

*Rectification of Induction;* fourthly, of *Varying the Investigation according to the nature of the Subject;* fifthly, of *Prerogative Natures* with respect to Investigation, or of what should be inquired first and what last; sixthly, of the *Limits of Investigation,* or a Synopsis of all Natures in the Universe; seventhly, of the *Application to Practice,* or of things in their relation to Man; eighthly, of *Preparations for Investigation;* and lastly, of the *Ascending and Descending Scale of Axioms. . . .*

[Only the first part of this program was ever carried out. In Aphorisms xxii to lii Bacon lists and discusses some twenty-seven kinds of Prerogative Instances.]

# THOMAS HOBBES

## Leviathan

# LEVIATHAN

OR

# THE MATTER, FORM, AND POWER

OF A

# COMMONWEALTH

## Ecclesiastical and Civil

## THE INTRODUCTION

Nature, the art whereby God hath made and governs the world, is by the *art* of man, as in many other things, so in this also imitated, that it can make an artificial animal. For seeing life is but a motion of limbs, the beginning whereof is in some principal part within; why may we not say, that all *automata* (engines that move themselves by springs and wheels as doth a watch) have an artificial life? For what is the heart, but a spring; and the nerves, but so many strings, and the joints, but so many wheels, giving motion to the whole body, such as was intended by the artificer? Art goes yet further, imitating that rational and most excellent work of nature, *man*. For by art is created that great *Leviathan* called a *Commonwealth,* or *State,* in Latin *Civitas,* which is but an artificial man; though of greater stature and strength than the natural, for whose protection and defense it was intended; and in which the sovereignty is an artificial soul, as giving life and motion to the whole body; the magistrates, and other officers of judicature and execution, artificial joints; reward and punishment, by which fastened to the seat of the sovereignty every joint and member is moved to perform his duty, are the nerves, that do the same in the body natural; the wealth and riches of all the particular members, are the strength *salus populi,* the people's safety, its business; counsellors, by whom all things needful for it to know are suggested unto it, are the memory; equity and laws, an artificial reason and will; concord, health; sedition, sickness; and civil war, death. Lastly, the pacts and covenants, by which the parts of this body politic were at first made, set together, and united, resemble that *fiat,* or the *let us make man,* pronounced by God in the creation.

To describe the nature of this artificial man, I will consider:

First, the *matter* thereof, and the *artificer;* both which is *man.*

Secondly, *how,* and by what *covenants* it is made; what are the *rights* and just *power* or *authority* of a *sovereign;* and what it is that preserveth or dissolveth it.

Thirdly, what is a *Christian commonwealth.*

Lastly, what is the *kingdom of darkness.*

Concerning the first, there is a saying much usurped of late, that wisdom is acquired, not by reading of books, but of men. Consequently whereunto, those persons that for the most part can give no other proof of being wise, take great delight to show what they think they have read in men, by uncharitable censures of one another behind their backs. But there is another saying not of late understood, by which they might learn truly to read one another if they would take the pains: that is, *nosce teipsum,* Read thyself; which was not meant, as it is now used, to countenance either the barbarous state of men in power towards their inferiors, or to encourage men of low degree to a saucy behavior towards their betters; but to teach us that from the similitude of the thoughts and passions of one man to the thoughts and passions of another, whosoever looketh into himself, and considereth what he doth when he does think, opine, reason, hope, fear, etc. and upon what grounds; he shall thereby read and know what are the thoughts and passions of all other men upon the like occasions. I say the similitude of *passions,* which are the same in all men, desire, fear, hope, etc.; not the similitude of the *objects* of the passions, which are the things desired, feared, hoped, etc.: for these the constitution individual, and particular education, do so vary, and they are so easy to be kept from our knowledge, that the characters of man's heart, blotted and confounded as they are with dissembling, lying, counterfeiting, and erroneous doctrines, are legible only to him that searcheth hearts. And though by men's actions we do discover their design sometimes; yet to do it without comparing them with our own, and distinguishing all circumstances by which the case may come to be altered, is to decypher without a key, and be for the most part deceived, by too much trust or by too much diffidence, as he that reads is himself a good or evil man.

But let one man read another by his actions never so perfectly, it serves him only with his acquaintance, which are but few. He that is to govern a whole nation, must read in himself not this or that particular man, but mankind; which though it be hard to do, harder than to learn any language or science, yet when I shall have set down my own reading orderly and perspicuously, the pains left another will be only to consider if he also find not the same in himself. For this kind of doctrine admitteth no other demonstration.

# *PART I: OF MAN*

## CHAPTER I

### OF SENSE

CONCERNING the thoughts of man, I will consider them first singly, and afterwards in train, or dependence upon one another. Singly, they are every one a *representation* or *appearance,* of some quality or other accident of a body without us, which is commonly called an *object.* Which object worketh on the eyes, ears, and other parts of a man's body, and by diversity of working produceth diversity of appearances.

The original of them all is that which we call *sense,* for there is no conception in a man's mind which hath not at first, totally or by parts, been begotten upon the organs of sense. The rest are derived from that original.

To know the natural cause of sense is not very necessary to the business now in hand; and I have elsewhere written of the same at large. Nevertheless, to fill each part of my present method, I will briefly deliver the same in this place.

The cause of sense is the external body, or object, which presseth the organ proper to each sense, either immediately, as in the taste and touch; or mediately, as in seeing, hearing, and smelling; which pressure, by the mediation of the nerves, and other strings and membranes of the body, continued inwards to the brain and heart, causeth there a resistance, or counter-pressure, or endeavor of the heart to deliver itself, which endeavor, because outward, seemeth to be some matter without. And this seeming, or fancy, is that which men call *sense;* and consisteth, as to the eye, in a light, or color figured; to the ear, in a sound; to the nostril, in an odor; to the tongue and palate, in a savor; and to the rest of the body, in heat, cold, hardness, softness, and such other qualities as we discern by feeling. All which qualities, called *sensible,* are, in the object that causeth them, but so many several motions of the matter, by which it presseth our organs diversely. Neither in us that are pressed, are they anything else but divers motions; for motion produceth nothing but motion. But their appearance to us is fancy, the same waking that dreaming. And as pressing, rubbing, or striking the eye makes us fancy a light, and pressing the ear produceth a din, so do the bodies also we see or hear, produce the same by their strong though unobserved action. For if those colors and sounds were in the bodies, or objects that cause them, they could not be severed from them, as by glasses, and in echoes by reflection, we see they are; where we know the thing we see is in one place, the appearance in another. And though at some certain distance the real and very object seem invested with the fancy it begets in us, yet still the object is one thing, the image or fancy is another. So that sense, in all cases, is nothing else but original fancy, caused, as I have said, by the pressure, that is, by the motion, of external things upon our eyes, ears, and other organs thereunto ordained.

But the philosophy schools, through all the universities of Christendom, grounded upon certain texts of Aristotle, teach another doctrine, and say, for the cause of vision, that the thing seen, sendeth forth on every side a *visible species,* in English, a visible show, apparition, or aspect, or a being seen; the receiving whereof into the eye is seeing. And for the cause of hearing, that the thing heard sendeth forth an *audible species,* that is an audible aspect, or audible being seen; which entering at the ear maketh hearing. Nay, for the cause of understanding also, they say the thing understood sendeth forth an *intelligible species,* that is, an intelligible being seen; which, coming into the understanding, makes us understand. I say not this as disproving the use of universities; but because I am to speak hereafter of their office in a commonwealth, I must let you see on all occasions by the way, what things would be amended in them; amongst which the frequency of insignificant speech is one.

## CHAPTER II

### OF IMAGINATION

THAT when a thing lies still, unless somewhat else stir it, it will lie still for ever, is a truth that no man doubts of. But that when a thing is in motion, it will eternally be in motion, unless somewhat else stay it, though the reason be the same, namely, that nothing can change itself, is not so easily assented to. For men measure, not only other men, but all other things, by themselves; and because they find themselves subject, after motion, to pain and lassitude, think everything else grows weary of motion, and seeks repose of its own accord; little considering whether it be not some other motion, wherein that desire of rest they find in themselves consisteth. From hence it is that the schools say, heavy bodies fall downwards out of an appetite to rest, and to conserve their nature in that place which is most proper for them; ascribing appetite, and knowledge of what is good for their conservation, which is more than man has, to things inanimate, absurdly.

When a body is once in motion, it moveth, unless something else hinder it, eternally; and whatsoever hindereth it cannot in an instant, but in time and by degrees, quite extinguish it; and as we see in the water, though the wind cease, the waves give not over rolling for a long time after: so also it happeneth in that motion which is made in the internal parts of a man, then, when he sees, dreams, etc. For after the object is removed, or the eye shut, we still retain an image of the thing seen, though more obscure than when we see it. And this is it, the Latins call *imagination,* from the image made in seeing; and apply the same, though improperly, to all the other senses. But the Greeks call it *fancy;* which signifies appearance, and is as proper to one sense, as to another. Imagination therefore is nothing but *decaying sense;* and is found in men, and many other living creatures, as well sleeping as waking.

The decay of sense in men waking, is not the decay of the motion made in sense; but an obscuring of it, in such manner as the light of the sun obscureth the light of the stars; which stars do no less exercise their virtue, by which they are visible, in the day than in the night. But because amongst many strokes which our eyes, ears, and other organs receive from external bodies, the predominant only is sensible; therefore, the light of the sun being predominant, we are not affected with the action of the stars. And any object being removed from our eyes, though the impression it made in us remain, yet other objects more present succeeding and working on us, the imagination of the past is obscured and made weak, as the voice of a man is in the noise of the day. From whence it followeth that the longer the time is, after the sight or sense of any object, the weaker is the imagination. For the continual change of man's body destroys in time the parts which in sense were moved; so that distance of time, and of place, hath one and the same effect in us. For as at a great distance of place, that which we look at appears dim, and without distinction of the smaller parts; and as voices grow weak, and inarticulate; so also, after great distance of time, our imagination of the past is weak; and we lose, for example, of cities we have seen, many particular streets, and of actions, many particular circumstances. This decaying sense, when we would express the thing itself, I mean fancy itself, we call *imagination,* as I said before; but when we would express the decay, and signify that the sense is fading, old, and past, it is called *memory.* So that imagination and memory are but one thing, which for divers considerations hath divers names.

Much memory, or memory of many things, is called *experience.* Again, imagination being only of those things which have been formerly perceived by sense, either all at once or by parts at several times; the former, which is the imagining the whole object as it was presented to the sense, is *simple* imagination, as when one imagineth a man, or horse, which he hath seen before. The other is *compounded;* as when, from the sight of a man at one time and of a horse at another, we conceive in our mind a Centaur. So when a man compoundeth the image of his own person with the image of the actions of another man, as when a man imagines himself a Hercules or an Alexander, which happeneth often to them that are much taken with reading of romances, it is a compound imagination, and properly but a fiction of the mind. There be also other imaginations that rise in men, though waking, from the great impression made in sense: as from gazing upon the sun, the impression leaves an image of the sun before our eyes a long time after; and from being long and vehemently attent upon geometrical figures, a man shall in the dark, though awake, have the images of lines and angles before his eyes; which kind of fancy hath no particular name, as being a thing that doth not commonly fall into men's discourse.

The imaginations of them that sleep are those we call *dreams.* And these also, as all other imaginations, have been before, either totally or by parcels, in the sense. And because in sense, the brain and nerves, which are the necessary organs of sense, are so benumbed in sleep, as not easily to be moved by the action of external objects, there can happen in sleep no imagination, and therefore no dream, but what proceeds from the agitation of the inward parts of man's body; which inward parts, for the connection they have with the brain and other organs when they be distempered, do keep the same in motion; whereby the imaginations there formerly made, appear as if a man were waking; saving that the organs of sense being now benumbed, so as there is no new object which can master and obscure them with a more vigorous impression, a dream must needs be more clear, in this silence of sense, than our waking thoughts. And hence it cometh to pass that it is a hard matter, and by many thought impossible, to distinguish exactly between sense and dreaming. For my part, when I consider that in dreams I do not often nor constantly think of the same persons, places, objects, and actions, that I do waking; nor remember so long a train of coherent thoughts, dreaming, as at other times; and because waking I often observe the absurdity of dreams, but never dream of the absurdities of my waking thoughts; I am well satisfied that, being awake, I know I dream not, though when I dream I think myself awake.

And seeing dreams are caused by the distemper of some of the inward parts of the body, divers distempers must needs cause different dreams. And hence it is that lying cold breedeth dreams of fear, and raiseth the thought and image of some fearful object, the motion from the brain to the inner parts and from the inner parts to the brain being reciprocal; and that as anger causeth heat in some parts of the body when we are awake, so when we sleep the overheating of the same parts causeth anger, and raiseth up in the brain the imagination of an enemy. In the same manner, as natural kindness, when we are awake, causeth desire, and desire maketh heat in certain other parts of the body; so also too much heat in those parts, while we sleep, raiseth in the brain the imagination of some kindness shown. In sum, our dreams are the reverse of our waking imaginations; the motion when we are awake beginning at one end, and when we dream at another.

The most difficult discerning of a man's dream from his waking thoughts is, then, when by some accident we observe not that we have slept: which is easy to happen to a man full of fearful thoughts, and whose conscience is much troubled; and that sleepeth, without the circumstances of going to bed or putting off his clothes, as one that noddeth in a chair. For he that taketh pains, and industriously lays himself to sleep, in case any uncouth and exhorbitant fancy come unto him, cannot easily think it other than a dream. We read of Marcus Brutus (one that had his life given him by Julius Cæsar, and was also his favorite, and notwithstanding murdered him), how at Philippi, the night before he gave battle to Augustus Cæsar, he saw a fearful apparition, which is commonly related by historians as a vision; but considering the circumstances, one may easily judge to have been but a short dream. For sitting in his tent, pensive and troubled with the horror of his rash act, it was not hard for him, slumbering in the cold, to dream of that which most affrighted him; which fear, as by degrees it made him wake, so also it must needs make the apparition by degrees to vanish; and having no assurance that he slept, he could have no cause to think it a dream, or anything but a vision. And this is no very rare accident; for even they that be perfectly awake, if they be timorous and superstitious, possessed with fearful tales, and alone in the dark, are subject to the like fancies, and believe they see spirits and dead men's ghosts walking in churchyards; whereas it is either their fancy only, or else the knavery of such persons as make use of such superstitious fear, to pass disguised in the night to places they would not be known to haunt.

From this ignorance of how to distinguish dreams, and other strong fancies, from vision and sense, did arise the greatest part of the religion of the Gentiles in time past, that worshipped satyrs, fawns, nymphs, and the like; and nowadays the opinion that rude people have of fairies, ghosts, and goblins, and of the power of witches. For, as for witches, I think not that their witchcraft is any real power; but yet that they are justly punished, for the false belief they have that they can do such mischief, joined with their purpose to do it if they can; their trade being nearer to a new religion than to a craft or science. And for fairies, and walking ghosts, the opinion of them has, I think, been on purpose either taught or not confuted, to keep in credit the use of exorcism, of crosses, of holy water, and other such inventions of ghostly men. Nevertheless, there is no doubt but God can make unnatural apparitions; but that He does it so often as men need to fear such things more than they fear the stay or change of the course of nature, which He also can stay and change, is no point of Christian faith. But evil men, under pretext that God can do anything, are so bold as to say anything when it serves their turn, though they think it untrue; it is the part of a wise man, to believe them no farther than right reason makes that which they say appear credible. If this superstitious fear of spirits were taken away, and with it, prognostics from dreams, false prophecies, and many other things depending thereon, by which crafty ambitious persons abuse the simple people, men would be much more fitted than they are for civil obedience.

And this ought to be the work of the schools; but they rather nourish such doctrine. For, not knowing what imagination or the senses are, what they receive, they teach: some saying that imaginations rise of themselves, and have no cause; others, that they rise most commonly from the will; and that good thoughts are blown (inspired) into a man by God, and evil thoughts by the Devil; or that good thoughts are poured (infused) into a man by God, and evil ones by the Devil. Some say the senses receive the species of things, and deliver them to the common sense; and the common sense delivers them over to the fancy, and the fancy to the memory, and the memory to the judgment, like handling of things from one to another with many words making nothing understood.

The imagination that is raised in man, or any other creature indued with the faculty of imagining, by words, or other voluntary signs, is that we generally call *understanding;* and is common to man and beast. For a dog by custom will understand the call, or the rating of his master; and so will many other beasts. That understanding which is peculiar to man, is the understanding not only his will, but his conceptions and thoughts, by the sequel and contexture of the names of things into affirmations, negations, and other forms of speech; and of this kind of understanding I shall speak hereafter.

## CHAPTER III

## OF THE CONSEQUENCE OR TRAIN OF IMAGINATIONS

BY *consequence,* or *train* of thoughts, I understand that succession of one thought to another, which is called, to distinguish it from discourse in words, *mental discourse.*

When a man thinketh on anything whatsoever, his next thought after is not altogether so casual as it seems to be. Not every thought to every thought succeeds indifferently. But as we have no imagination, whereof we have not formerly had sense, in whole or in parts; so we have no transition from one imagination to another, whereof we never had the like before in our senses. The reason whereof is this. All fancies are motions within us, relics of those made in the sense; and those motions that immediately succeeded one another in the sense, continue also together after sense: insomuch as the former coming again to take place, and be predominant, the latter followeth, by coherence of the matter moved, in such manner as water upon a plane table is drawn which way any one part of it is guided by the finger. But because in sense, to one and the same thing perceived, sometimes one thing, sometimes another succeedeth, it comes to pass in time that in the imagining of anything, there is no certainty what we shall imagine next; only this is certain, it shall be something that succeeded the same before, at one time or another.

This train of thoughts, or mental discourse, is of two sorts. The first is *unguided, without design,* and inconstant; wherein there is no passionate thought, to govern and direct those that follow, to itself, as the end and scope of some desire or other passion: in which case the thoughts are said to wander, and seem impertinent one to another, as in a dream. Such are commonly the thoughts of men that are not only without company, but also without care of anything; though even then their thoughts are as busy as at other times, but without harmony; as the sound which a lute out of tune would yield to any man, or in tune to one that could not play. And yet in this wild ranging of the mind, a man may ofttimes perceive the way of it, and the dependence of one thought upon another. For in a discourse of our present civil war, what could seem more impertinent than to ask, as one did, what was the value of a Roman penny? Yet the coherence to me was manifest enough. For the thought of the war introduced the thought of the delivering up the king to his enemies; the thought of that, brought in the thought of the delivering up of Christ; and that again the thought of the thirty pence, which was the price of that treason; and thence easily followed that malicious question, and all this in a moment of time; for thought is quick.

The second is more constant; as being *regulated* by some desire, and design. For the impression made by such things as we desire, or fear, is strong, and permanent, or, if it cease for a time, of quick return: so strong it is sometimes as to hinder and break our sleep. From desire ariseth the thought of some means we have seen produce the like of that which we aim at; and from the thought of that, the thought of means to that mean; and so continually, till we come to some beginning within our own power. And because the end, by the greatness of the impression, comes often to mind, in case our thoughts begin to wander, they are quickly again reduced into the way: which observed by one of the seven wise men, made him give men this precept, which is now worn out, *Respice finem;* that is to say, in all your actions, look often upon what you would have, as the thing that directs all your thoughts in the way to attain it.

The train of regulated thoughts is of two kinds: one, when of an effect imagined we seek the causes, or means that produce it; and this is common to man and beast. The other is, when imagining anything whatsoever, we seek all the possible effects that can by it be produced; that is to say, we imagine what we can do with it when we have it. Of which I have not at any time seen any sign but in man only; for this is a curiosity hardly incident to the nature of any living creature that has no other passion but sensual, such as are hunger, thirst, lust, and anger. In sum, the discourse of the mind, when it is governed by design, is nothing but seeking, or the faculty of invention, which the Latins called *sagacitas,* and *solertia*—a hunting out of the causes of some effect, present or past, or of the effects of some present or past cause. Sometimes a man seeks what he hath lost; and from that place and time wherein he misses it, his mind runs back, from place to place and time to time, to find where and when he had it; that is to say, to find some certain, and limited time and place, in which to begin a method of seeking. Again, from thence, his thoughts run over the same places and times, to find what action or other occasion might make him lose it. This we call remembrance, or calling to mind; the Latins call it *reminiscentia,* as it were a re-conning of our former actions.

Sometimes a man knows a place determinate within the compass whereof he is to seek; and then his thoughts run over all the parts thereof, in the same manner as one would sweep a room to find a jewel, or as a spaniel ranges the field till he find a scent, or as a man should run over the alphabet to start a rhyme.

Sometimes a man desires to know the event of an action;

and then he thinketh of some like action past, and the events thereof one after another; supposing like events will follow like actions. As he that foresees what will become of a criminal, re-cons what he has seen follow on the like crime before; having this order of thoughts, the crime, the officer, the prison, the judge, and the gallows. Which kind of thoughts, is called foresight, and prudence, or providence; and sometimes wisdom; though such conjecture, through the difficulty of observing all circumstances, be very fallacious. But this is certain; by how much one man has more experience of things past than another, by so much also he is more prudent, and his expectations the seldomer fail him. The present only has a being in nature; things past have a being in the memory only, but things to come have no being at all; the future being but a fiction of the mind, applying the sequels of actions passed, to the actions that are present; which with most certainty is done by him that has most experience, but not with certainty enough. And though it be called prudence when the event answereth our expectation, yet in its own nature it is but presumption. For the foresight of things to come, which is providence, belongs only to Him by Whose will they are to come. From Him only, and supernaturally, proceeds prophecy. The best prophet naturally is the best guesser; and the best guesser, he that is most versed and studied in the matters he guesses at: for he hath most signs to guess by.

A *sign* is the evident antecedent of the consequent; and contrarily, the consequent of the antecedent, when the like consequences have been observed before; and the oftener they have been observed, the less uncertain is the sign. And therefore he that has most experience in any kind of business, has most signs whereby to guess at the future time; and consequently is the most prudent; and so much more prudent than he that is new in that kind of business, as not to be equalled by any advantage of natural and extemporary wit: though perhaps many young men think the contrary.

Nevertheless it is not prudence that distinguisheth man from beast. There be beasts that at a year old observe more, and pursue that which is for their good more prudently, than a child can do at ten.

As prudence is a *presumption* of the *future,* contracted from the *experience* of time *past;* so there is a presumption of things past taken from other things, not future, but past also. For he that hath seen by what courses and degrees a flourishing state hath first come into civil war, and then to ruin; upon the sight of the ruins of any other state, will guess the like war and the like courses have been there also. But this conjecture has the same uncertainty almost with the conjecture of the future; both being grounded only upon experience.

There is no other act of man's mind, that I can remember, naturally planted in him, so as to need no other thing to the exercise of it, but to be born a man and live with the use of his five senses. Those other faculties, of which I shall speak by and by, and which seem proper to man only, are acquired and increased by study and industry; and of most men learned by instruction, and discipline; and proceed all from the invention of words, and speech. For besides sense, and thoughts, and the train of thoughts, the mind of man has no other motion; though by the help of speech, and method, the same faculties may be improved to such a height, as to distinguish men from all other living creatures.

Whatsoever we imagine is *finite.* Therefore there is no idea or conception of anything we call *infinite.* No man can have in his mind an image of infinite magnitude, nor conceive infinite swiftness, infinite time, or infinite force, or infinite power. When we say anything is infinite, we signify only that we are not able to conceive the ends, the bounds of the things named; having no conception of the thing, but of our own inability. And therefore the name of God is used, not to make us conceive Him, for He is incomprehensible; and His greatness and power are unconceivable; but that we may honor Him. Also because whatsoever, as I said before, we conceive, has been perceived first by sense, either all at once or by parts: a man can have no thought, representing anything, not subject to sense.

No man therefore can conceive anything but he must conceive it in some place, and indued with some determinate magnitude, and which may be divided into parts; nor that anything is all in this place and all in another place at the same time; nor that two or more things can be in one and the same place at once: for none of these things ever have, nor can be incident to sense; but are absurd speeches, taken upon credit, without any signification at all, from deceived philosophers, and deceived or deceiving schoolmen.

## CHAPTER IV

## OF SPEECH

THE invention of *printing,* though ingenious, compared with the invention of *letters* is no great matter. But who was the first that found the use of letters, is not known. He that first brought them into Greece, men say was Cadmus, the son of Agenor, king of Phœnicia. A profitable invention for continuing the memory of time past, and the conjunction of mankind dispersed into so many and distant regions of the earth; and withal difficult, as proceeding from a watchful observation of the divers motions of the tongue, palate, lips, and other organs of speech; whereby to make as many differences of characters, to remember them. But the most noble and profitable invention of all other, was that of *speech,* consisting of *names* or *appellations,* and their connection; whereby men register their thoughts, recall them when they are past, and also declare them one to another for mutual utility and conversation; without which there had been amongst men neither commonwealth, nor society, nor contract, nor peace, no more than amongst lions, bears, and wolves. The first author of speech was God himself, that instructed Adam how to name such creatures as He presented to his sight; for the Scripture goeth no further in this matter. But this was sufficient to direct him to add more names, as the experience and use of the creatures should give him occasion; and to join them in such manner, by degrees, as to make himself understood; and so, by succession of time, so much language might be gotten as he had found use for; though not so copious as an orator or philosopher has need of: for I do not find anything in the Scripture out of which, directly or by consequence, can be gathered that Adam was taught the names of all figures, numbers, measures, colors, sounds, fancies, relations; much less the names of words and speech, as *general, special, affirmative, negative, interrogative, optative, infinitive,* all which are useful; and least of all, of *entity, intentionality, quiddity,* and other insignificant words of the school.

But all this language gotten and augmented by Adam and his posterity, was again lost at the Tower of Babel, when, by the hand of God, every man was stricken, for his rebellion, with an oblivion of his former language. And being hereby forced to disperse themselves into several parts of the world, it must needs be that the diversity of tongues that now is, proceeded by degrees from them, in such manner as need, the mother of all inventions, taught them; and in tract of time grew everywhere more copious.

The general use of speech is to transfer our mental discourse into verbal, or the train of our thoughts into a train of words; and that for two commodities, whereof one is the registering of the consequences of our thoughts; which, being apt to slip out of our memory and put us to a new labor, may again be recalled by such words as they were marked by. So that the first use of names is to serve for *marks,* or *notes* of remembrance. Another is, when many use the same words, to signify, by their connection and order, one to another, what they conceive, or think of each matter; and also what they desire, fear, or have any other passion for. And for this use they are called *signs.* Special uses of speech are these: first, to register what by cogitation we find to be the cause of anything, present or past, and what we find things present or past may produce or effect; which, in sum, is acquiring of arts. Secondly, to show to others that knowledge which we have

considered, nothing but powers in it to produce those ideas in us: we also by our senses perceive the color and brittleness of charcoal, whereby we come by the knowledge of another power in fire, which it has to change the color and consistency of wood. By the former, fire immediately, by the latter it mediately, discovers to us these several powers, which therefore we look upon to be a part of the qualities of fire, and so make them a part of the complex idea of it. For, all those powers that we take cognizance of, terminating only in the alteration of some sensible qualities in those subjects on which they operate, and so making them exhibit to us new sensible ideas; therefore it is that I have reckoned these powers amongst the simple ideas which make the complex ones of the sorts of substances; though these powers, considered in themselves, are truly complex ideas. And in this looser sense I crave leave to be understood, when I name any of these potentialities amongst the simple ideas which we recollect in our minds when we think of particular substances. For the powers that are severally in them are necessary to be considered, if we will have true distinct notions of the several sorts of substances.

8. Nor are we to wonder that powers make a great part of our complex ideas of substances, since their secondary qualities are those which, in most of them, serve principally to distinguish substances one from another, and commonly make a considerable part of the complex idea of the several sorts of them. For, our senses failing us in the discovering of the bulk texture, and figure of the minute parts of bodies, on which their real constitutions and differences depend, we are fain to make use of their secondary qualities, as the characteristical notes and marks whereby to frame ideas of them in our minds, and distinguish them one from another, all which secondary qualities, as has been shown, are nothing but bare powers. For the color and taste of opium are, as well as its soporific or anodyne virtues, mere powers depending on its primary qualities, whereby it is fitted to produce different operations on different parts of our bodies.

9. *Three sorts of ideas make our complex ones of substances.*—The ideas that make our complex ones of corporeal substances are of these three sorts. First, the ideas of the primary qualities of things which are discovered by our senses, and are in them even when we perceive them not: such are the bulk, figure, number, situation, and motion of the parts of bodies, which are really in them, whether we take notice of them or no. Secondly, the sensible secondary qualities which, depending on these, are nothing but the powers those substances have to produce several ideas in us by our senses; which ideas are not in the things themselves otherwise than as any thing is in its cause. Thirdly, the aptness we consider in any substance to give or receive such alterations of primary qualities as that the substance so altered should produce in us different ideas from what it did before; these are called active and passive powers: all which powers, as far as we have any notice or notion of them, terminate only in sensible simple ideas. For whatever alteration a loadstone has the power to make in the minute particles of iron, we should have no notion of any power it had at all to operate on iron, did not its sensible motion discover it; and I doubt not but there are a thousand changes that bodies we daily handle have a power to cause in one another, which we never suspect, because they never appear in sensible effects.

10. Powers therefore justly make a great part of our complex ideas of substance. He that will examine his complex idea of gold, will find several of its ideas that make it up to be only powers: as the power of being melted, but of not spending itself in the fire, of being dissolved in *aqua regia,* are ideas as necessary to make up our complex idea of gold, as its color, and weight: which, if duly considered, are also nothing but different powers. For, to speak truly, yellowness is not actually in gold; but is a power in gold to produce that idea in us by our eyes, when placed in a due light; and the heat which we cannot leave out of our idea of the sun, is no more really in the sun than the white color it introduces into wax. These are both equally powers in the sun, oper-

ating, by the motion and figure of its insensible parts, so on a man as to make him have the idea of heat; and so on wax as to make it capable to produce in a man the idea of white.

11. *The now secondary qualities of bodies would disappear, if we could discover the primary ones of their minute parts.*—Had we senses acute enough to discern the minute particles of bodies, and the real constitution on which their sensible qualities depend, I doubt not but they would produce quite different ideas in us, and that which is now the yellow color of gold would then disappear, and instead of it we should see an admirable texture of parts of a certain size and figure. This microscopes plainly discover to us; for, what to our naked eyes produces a certain color is, by thus augmenting the acuteness of our senses, discovered to be quite a different thing; and the thus altering, as it were, the proportion of the bulk of the minute parts of a colored object to our usual sight, produces different ideas from what it did before. Thus sand, or pounded glass, which is opaque and white to the naked eye, is pellucid in a microscope; and a hair seen this way loses its former color, and is in a great measure pellucid, with a mixture of some bright sparkling colors, such as appear from the refraction of diamonds and other pellucid bodies. Blood to the naked eye appears all red; but by a good miscroscope, wherein its lesser parts appear, shows only some few globules of red, swimming in a pellucid liquor; and how these red globules would appear, if glasses could be found that yet could magnify them one thousand or ten thousand times more, is uncertain. . . .

14. *Our ideas of substances.*—But to return to the matter in hand—the ideas we have of substances, and the ways we come by them: I say, our specific ideas of substances are nothing else but *a collection of a certain number of simple ideas, considered as united in one thing*. These ideas of substances, though they are commonly simple apprehensions, and the names of them simple terms, yet in effect are complex and compounded. Thus the idea which an Englishman signifies

by the name swan, is white color, long neck, red beak, black legs, and whole feet, and all these of a certain size, with a power of swimming in the water, and making a certain kind of noise; and perhaps to a man who has long observed this kind of birds, some other properties, which all terminate in sensible simple ideas, all united in one common subject.

15. *Idea of spiritual substances as clear as of bodily substances.*—Besides the complex ideas we have of material sensible substances, of which I have last spoken, by the simple ideas we have taken from those operations of our own minds, which we experiment daily in ourselves, as thinking, understanding, willing, knowing, and power of beginning motion, etc., co-existing in some substance, we are able to frame *the complex idea of an immaterial spirit.* And thus, by putting together the ideas of thinking, perceiving, liberty, and power of moving themselves and other things, we have as clear a perception and notion of immaterial substances as we have of material. For putting together the ideas of thinking and willing, or the power of moving or quieting corporeal motion, joined to substance, of which we have no distinct idea, we have the idea of an immaterial spirit; and by putting together the ideas of coherent solid parts, and a power of being moved, joined with substance, of which, likewise we have no positive idea, we have the idea of matter. The one is as clear and distinct an idea as the other: the idea of thinking and moving a body being as clear and distinct ideas as the ideas of extension, solidity, and being moved. For our idea of substance is equally obscure, or none at all, in both; it is but a supposed I-know-not-what, to support those ideas we call accidents. [It is for want of reflection that we are apt to think that our senses show us nothing but material things. Every act of sensation, when duly considered, gives us an equal view of both parts of nature, the corporeal and spiritual. For whilst I know, by seeing or hearing, etc., that there is some corporeal being without me, the object of that sensation, I do more certainly know that there is some spiritual being within me that sees and hears. This I must be convinced cannot be the action

of bare insensible matter, nor ever could be without an immaterial thinking being.]

16. *No idea of abstract substance.*—By the complex idea of extended, figured, colored, and all other sensible qualities, which is all that we know of it, we are as far from the idea of the substance of body as if we knew nothing at all; nor after all the acquaintance and familiarity which we imagine we have with matter, and the many qualities men assure themselves they perceive and know in bodies, will it, perhaps, upon examination be found that they have any more or clearer primary ideas belonging to body than they have belonging to immaterial spirit.

17. *The cohesion of solid parts and impulse, the primary ideas of body.*—The primary ideas we have peculiar to body, as contradistinguished to spirit, are the *cohesion of solid and consequently separable parts,* and a *power of communicating motion by impulse.* These, I think, are the original ideas proper and peculiar to body; for figure is but the consequence of finite extension.

18. *Thinking and motivity, the primary ideas of spirit.*—The ideas we have belonging and peculiar to spirit are *thinking,* and *will,* or a *power of putting body into motion by thought,* and, which is consequent to it, *liberty.* For as body cannot but communicate its motion by impulse to another body, which it meets with at rest; so the mind can put bodies into motion, or forbear to do so, as it pleases. The ideas of existence, duration, and mobility are common to them both. . . .

29. To conclude: Sensation convinces us that there are solid, extended substances; and reflection, that there are thinking ones; experience assures us of the existence of such beings; and that the one hath a power to move body by impulse, the other by thought; this we cannot doubt of. Experience, I say, every moment furnishes us with the clear ideas both of the one and the other. But beyond these ideas, as received from their proper sources, our faculties will not reach. If we would inquire farther into their nature, causes, and manner, we per-

ceive not the nature of extension clearer than we do of thinking. If we would explain them any farther, one is as easy as the other; and there is no more difficulty to conceive how a substance we know not should by thought set body into motion, than how a substance we know not should by impulse set body into motion. So that we are no more able to discover wherein the ideas belonging to body consist, than those belonging to spirit. From whence it seems probable to me that the simple ideas we receive from sensation and reflection are the boundaries of our thoughts; beyond which, the mind, whatever efforts it would make, is not able to advance one jot; nor can it make any discoveries, when it would pry into the nature and hidden causes of those ideas.

30. *Idea of body and spirit compared.*—So that, in short, the idea we have of spirit, compared with the idea we have of body, stands thus: the substance of spirit is unknown to us, and so is the substance of body equally unknown to us; two primary qualities or properties of body, viz. solid coherent parts and impulse, we have distinct clear ideas of; so likewise we know and have distinct clear ideas of two primary qualities or properties of spirit, viz., thinking, and a power of action, i. e. a power of beginning or stopping several thoughts or motions. We have also the ideas of several qualities inherent in bodies, and have the clear distinct ideas of them; which qualities are but the various modifications of the extension of cohering solid parts and their motion. We have likewise the ideas of several modes of thinking, viz., believing, doubting, intending, fearing, hoping; all which are but the several modes of thinking. We have also the ideas of willing, and moving the body consequent to it, and with the body itself too; for, as has been showed, spirit is capable of motion.

31. *The notion of spirit involves no more difficulty in it than that of body.*—Lastly, if this notion of immaterial spirit may have, perhaps, some difficulties in it not easy to be explained, we have therefore no more reason to deny or doubt the existence of such spirits, than we have to deny or doubt the existence of body because the notion of body is cumbered

with some difficulties, very hard and perhaps impossible to be explained or understood by us. For I would fain have instanced anything in our notion of spirit more perplexed, or nearer a contradiction, than the very notion of body includes in it; the divisibility *in infinitum* of any finite extension involving us, whether we grant or deny it, in consequences impossible to be explicated or made in our apprehensions consistent; consequences that carry greater difficulty and more apparent absurdity, than anything can follow from the notion of an immaterial knowing substance.

32. *We know nothing beyond our simple ideas.*—Which we are not at all to wonder at, since we, having but some few superficial ideas of things, discovered to us only by the senses from without, or by the mind reflecting on what it experiments in itself within, have no knowledge beyond that, much less of the internal constitution and true nature of things, being destitute of faculties to attain it. And therefore experimenting and discovering in ourselves knowledge and the power of voluntary motion, as certainly as we experiment or discover in things without us the cohesion and separation of solid parts, which is the extension and motion of bodies; we have as much reason to be satisfied with our notion of immaterial spirit, as with our notion of body; and the existence of the one as well as the other. For, it being no more a contradiction that thinking should exist separate and independent from solidity, than it is a contradiction that solidity should exist separate and independent from thinking, they being both but simple ideas, independent one from another; and having as clear and distinct ideas in us of thinking as of solidity, I know not why we may not as well allow a thinking thing without solidity, i. e. immaterial, to exist, as a solid thing without thinking, i. e. matter, to exist; especially since it is not harder to conceive how thinking should exist without matter, than how matter should think. For whensoever we would proceed beyond these simple ideas we have from sensation and reflection, and dive farther into the nature of things, we fall presently into darkness and obscurity, perplexedness and diffi-

culties; and can discover nothing farther but our own blindness and ignorance. But whichever of these complex ideas be clearest, that of body or immaterial spirit, this is evident, that the simple ideas that make them up are no other than what we have received from sensation or reflection; and so is it of all our other ideas of substances, even of God Himself.

33. *Idea of God.*—For if we examine the idea we have of the incomprehensible Supreme Being, we shall find that we come by it the same way; and that the complex ideas we have both of God and separate spirits are made of the simple ideas we receive from reflection: v. g., having, from what we experiment in ourselves, got the ideas of existence and duration, of knowledge and power, of pleasure and happiness, and of several other qualities and powers which it is better to have than to be without; when we would frame an idea the most suitable we can to the Supreme Being, we enlarge every one of these with our idea of infinity; and so, putting them together, make our complex idea of God. For that the mind has such a power of enlarging some of its ideas, received from sensation and reflection, has been already showed.

34. If I find that I know some few things, and some of them, or all, perhaps, imperfectly; I can frame an idea of knowing twice as many, which I can double again as often as I can add to number; and thus enlarge my idea of knowledge, by extending its comprehension to all things existing or possible. The same also I can do of knowing them more perfectly; i. e. all their qualities, powers, causes, consequences, and relations, etc., till all be perfectly known that is in them, or can any way relate to them; and thus frame the idea of infinite or boundless knowledge. The same may also be done of power, till we come to that we call infinite; and also of the duration of existence without beginning or end; and so frame the idea of an eternal being. The degrees or extent, wherein we ascribe existence, power, wisdom, and all other perfections (which we can have any ideas of), to that Sovereign Being which we call God, being all boundless and infinite, we frame the best idea of Him our minds are capable of: all which is done, I say, by

enlarging those simple ideas we have taken from the operations of our own minds by reflection, or by our senses from exterior things, to that vastness to which infinity can extend them.

35. For it is infinity which, joined to our ideas of existence, power, knowledge, etc., makes that complex idea whereby we represent to ourselves, the best we can, the Supreme Being. For though in His own essence, which certainly we do not know (not knowing the real essence of a pebble, or a fly, or of our own selves), God be simple and uncompounded; yet, I think, I may say we have no other idea of Him but a complex one of existence, knowledge, power, happiness, etc., infinite and eternal: which are all distinct ideas, and some of them being relative are again compounded of others; all which, being, as has been shown, originally got from sensation and reflection, go to make up the idea or notion we have of God.

36. *No ideas in our complex one of spirits, but those got from sensation or reflection.*—This farther is to be observed, that there is no idea we attribute to God, bating infinity, which is not also a part of our complex idea of other spirits. Because, being capable of no other simple ideas belonging to any thing but body, but those which by reflection we receive from the operation of our own minds, we can attribute to spirits no other but what we receive from thence: and all the difference we can put between them in our contemplation of spirits, is only in the several extents and degrees of their knowledge, power, duration, happiness, etc. For that in our ideas, as well of spirits as of other things, we are restrained to those we receive from sensation and reflection, is evident from hence, that in our ideas of spirits, how much soever advanced in perfection beyond those of bodies, even to that of infinite, we cannot yet have any idea of the manner wherein they discover their thoughts one to another: though we must necessarily conclude that separate spirits, which are beings that have perfecter knowledge and greater happiness than we, must needs have also a perfecter way of communicating their

thoughts than we have, who are fain to make use of corporeal signs and particular sounds, which are therefore of most general use, as being the best and quickest we are capable of. But of immediate communication having no experiment in ourselves, and consequently no notion of it at all, we have no idea how spirits which use not words can with quickness, or, much less, how spirits that have no bodies, can be masters of their own thoughts, and communicate or conceal them at pleasure, though we cannot but necessarily suppose they have such a power.

37. *Recapitulation.*—And thus we have seen what kind of ideas we have of substances of all kinds, wherein they consist, and how we came by them. From whence, I think, it is very evident:—

First, that all our ideas of the several sorts of substances are nothing but collections of simple ideas, with a supposition of something to which they belong, and in which they subsist; though of this supposed something we have no clear distinct idea at all.

Secondly, that all the simple ideas that, thus united in one common substratum, make up our complex ideas of several sorts of substances, are no other but such as we have received from sensation or reflection. So that even in those which we think we are most intimately acquainted with, and that come nearest the comprehension of our most enlarged conceptions, we cannot reach beyond those simple ideas. And even in those which seem most remote from all we have to do with, and do infinitely surpass anything we can perceive in ourselves by reflection, or discover by sensation in other things, we can attain to nothing but those simple ideas which we originally received from sensation or reflection; as is evident in the complex ideas we have of angels, and particularly of God Himself.

Thirdly, that most of the simple ideas that make up our complex ideas of substances, when truly considered, are only powers, however we are apt to take them for positive qualities: v. g., the greatest part of the ideas that make our complex idea of gold are yellowness, great weight, ductility, fusibility, and solubility in *aqua regia,* etc., all united together in an unknown substratum; all which ideas are nothing else but so many relations to other substances, and are not really in the gold considered barely in itself, though they depend on those real and primary qualities of its internal constitution, whereby it has a fitness differently to operate and be operated on by several other substances.

[The brief and unimportant chapter XXIV treats "Of Collective Ideas of Substances."]

## CHAPTER XXV

## OF RELATION

1. *Relation, what.*—Besides the ideas, whether simple or complex, that the mind has of things as they are in themselves, there are others it gets from their comparison one with another. The understanding, in the consideration of anything, is not confined to that precise object: it can carry any idea, as it were, beyond itself, or at least look beyond it to see how it stands in conformity to any other. When the mind so considers one thing, that it does, as it were, bring it to and set it by another, and carries its view from one to the other: this is, as the words import, *relation* and *respect;* and the denominations given to positive things, intimating that respect, and serving as marks to lead the thoughts beyond the subject itself denominated to something distinct from it, are what we call *relatives;* and the things so brought together, *related.* Thus, when the mind considers Caius as such a positive being, it takes nothing into that idea, but what really exists in Caius; v. g., when I consider him as man, I have nothing in my mind but the complex idea of the species man. So likewise, when I say, "Caius is a white man," I have nothing but the bare consideration of man who hath that white color. But when I give Caius the name 'husband,' I intimate some other per-

son; and when I give him the name 'whiter,' I intimate some other thing: in both cases my thought is led to something beyond Caius, and there are two things brought into consideration. And since any idea, whether simple or complex, may be the occasion why the mind thus brings two things together, and as it were, takes a view of them at once, though still considered as distinct; therefore any of our ideas may be the foundation of relation. As in the above-mentioned instance, the contract and ceremony of marriage with Sempronia, is the occasion of the denomination or relation of husband; and the color white, the occasion why he is said to be whiter than freestone. . . .

4. *Relation different from the things related.*—This farther may be observed, that the ideas of relation may be the same in men who have far different ideas of the things that are related, or that are thus compared: v. g., those who have far different ideas of a man, may yet agree in the notion of a father: which is a notion superinduced to the substance, or man, and refers only to an act of that thing called man, whereby he contributed to the generation of one of his own kind, let man be what it will.

5. *Change of relation may be without any change in the subject.*—The nature therefore of relation consists in the referring or comparing two things one to another; from which comparison one or both comes to be denominated. And if either of those things be removed or cease to be, the relation ceases, and the denomination consequent to it, though the other receive in itself no alteration at all: v. g., Caius, whom I consider today as a father ceases to be so tomorrow, only by the death of his son, without any alteration made in himself. Nay, barely by the mind's changing the object, to which it compares any thing, the same thing is capable of having contrary denominations at the same time: v. g., Caius, compared to several persons, may truly be said to be older and younger, stronger and weaker, etc. . . .

7. *All things capable of relation.*—Concerning relation in general, these things may be considered.

First, that there is no one thing, whether simple idea, substance, mode, or relation, or name of either of them, which is not capable of almost an infinite number of considerations in reference to other things; and therefore this makes no small part of men's thoughts and words: v. g., one single man may at once be concerned in and sustain all these following relations, and many more, viz., father, brother, son, grandfather, grandson, father-in-law, son-in-law, husband, friend, enemy, subject, general, judge, patron, client, professor, European, Englishman, islander, servant, master, possessor, captain, superior, inferior, bigger, less, older, younger, contemporary, like, unlike, etc., to an almost infinite number: he being capable of as many relations as there can be occasions of comparing him to other things, in any manner of agreement, disagreement, or respect whatsoever: for, as I said, relation is a way of comparing or considering two things together, and giving one or both of them some appellation from that comparison, and sometimes giving even the relation itself a name.

8. *The ideas of relations clearer often than of the subjects related.*—Secondly, this farther may be considered concerning relation, that though it be not contained in the real existence of things, but something extraneous and superinduced; yet the ideas which relative words stand for are often clearer and more distinct than of those substances to which they do belong. The notion we have of a father or brother is a great deal clearer and more distinct than that we have of a man; or, if you will, paternity is a thing whereof it is easier to have a clear idea than of humanity; and I can much easier conceive what a friend is than what God: because the knowledge of one action, or one simple idea, is oftentimes sufficient to give the notion of a relation; but to the knowing of any substantial being, an accurate collection of sundry ideas is necessary. A man, if he compares two things together, can hardly be supposed not to know what it is wherein he compares them; so that when he compares any things together, he cannot but have a very clear idea of that relation. The ideas then of relations are capable at least of being more perfect and distinct

in our minds than those of substances. Because it is commonly hard to know all the simple ideas which are really in any substance, but for the most part easy enough to know the simple ideas that make up any relation I think on, or have a name for: v. g., comparing two men, in reference to one common parent, it is very easy to frame the ideas of brothers, without having yet the perfect idea of a man. For, significant relative words, as well as others, standing only for ideas; and those being all either simple, or made up of simple ones; it suffices for the knowing the precise idea the relative term stands for, to have a clear conception of that which is the foundation of the relation; which may be done without having a perfect and clear idea of the thing it is attributed to. Thus having the notion that one laid the egg out of which the other was hatched, I have a clear idea of the relation of dam and chick between the two cassiowaries in St. James's Park; though, perhaps, I have but a very obscure and imperfect idea of those birds themselves.

9. *Relations all terminate in simple ideas.*—Thirdly, though there be a great number of considerations wherein things may be compared one with another, and so a multitude of relations; yet they all terminate in, and are concerned about, those simple ideas either of sensation or reflection, which I think to be the whole materials of all our knowledge. To clear this, I shall show it in the most considerable relations that we have any notion of; and in some that seem to be the most remote from sense of reflection: which yet will appear to have their ideas from thence, and leave it past doubt, that the notions we have of them are but certain simple ideas, and so originally derived from sense or reflection.

10. *Terms leading the mind beyond the subject denominated are relative.*—Fourthly, that relation being the considering of one thing with another, which is extrinsical to it, it is evident that all words that necessarily lead the mind to any other ideas than are supposed really to exist in that thing to which the word is applied, are relative words: v. g., a man, black, merry, thoughtful, thirsty, angry, extended; these and

the like are all absolute, because they neither signify nor intimate any thing but what does or is supposed really to exist in the man thus denominated: but father, brother, king, husband, blacker, merrier, etc., are words which, together with the thing they denominate, imply also something else separate and exterior to the existence of that thing.

11. *Conclusion.*—Having laid down these premises concerning relation in general, I shall now proceed to show in some instances how all the ideas we have of relation are made up, as the others are, only of simple ideas; and that they all, how refined or remote from sense soever they seem, terminate at last in simple ideas. I shall begin with the most comprehensive relation, wherein all things that do or can exist are concerned; and that is the relation of cause and effect. The idea whereof, how derived from the two fountains of all our knowledge, sensation and reflection, I shall in the next place consider.

## CHAPTER XXVI

## OF CAUSE AND EFFECT AND OTHER RELATIONS

1. *Whence their ideas got.*—In the notice that our senses take of the constant vicissitude of things, we cannot but observe that several particular both qualities and substances begin to exist; and that they receive this their existence from the due application and operation of some other being. From this observation we get our ideas of cause and effect. *That which produces any simple or complex idea,* we denote by the general name *cause;* and *that which is produced, effect.* Thus finding that in that substance which we call 'wax' fluidity, which is a simple idea that was not in it before, is constantly produced by the application of a certain degree of heat, we call the simple idea of heat, in relation to fluidity in wax, the cause of it, and fluidity the effect. So also finding that the substance, wood, which is a certain collection of simple ideas

so called, by the application of fire is turned into another substance called ashes, i. e. another complex idea, consisting of a collection of simple ideas, quite different from that complex idea which we call wood, we consider fire, in relation to ashes, as cause, and the ashes, as effect. So that whatever is considered by us to conduce or operate to the producing any particular simple idea, or collection of simple ideas, whether substance or mode, which did not before exist, hath thereby in our minds the relation of a cause, and so is denominated by us. . . .

## CHAPTER XXVII

## [OF IDENTITY AND DIVERSITY]

[1. *Wherein identity consists.*—Another occasion the mind often takes of comparing, is the very being of things, when, considering anything as existing at any determined time and place, we compare it with itself existing at another time, and thereon form the ideas of identity and diversity. When we see any thing to be in any place in any instant of time, we are sure (be it what it will) that it is that very thing, and not another, which at that same time exists in another place, how like and undistinguishable soever it may be in all other respects: and in this consists *identity,* when the ideas it is attributed to, vary not at all from what they were that moment wherein we consider their former existence, and to which we compare the present. For we never finding, nor conceiving it possible, that two things of the same kind should exist in the same place at the same time, we rightly conclude that whatever exists anywhere at any time, excludes all of the same kind, and is there itself alone. When therefore we demand whether anything be the *same* or no, it refers always to something that existed such a time in such a place, which it was certain at that instant was the same with itself and no other. From whence it follows that one thing cannot have two beginnings of existence, nor two things one beginning; it being impossible for two things of the same kind to be or exist in the same instant, in the very same place, or one and the same thing in different places. That therefore that had one beginning is the same thing; and that which had a different beginning in time and place from that, is not the same, but diverse. That which has made the difficulty about this relation, has been the little care and attention used in having precise notions of the things to which it is attributed.

2. *Identity of substances and of modes.*—We have the ideas but of three sorts of substances: (1) God. (2) Finite intelligences. (3) Bodies. First, God is without beginning, eternal, unalterable, and everywhere; and therefore concerning His identity, there can be no doubt. Secondly, finite spirits having had each its determinate time and place of beginning to exist, the relation to that time and place will always determine to each of them its identity as long as it exists. Thirdly, the same will hold of every particle of matter, to which no addition or subtraction of matter being made, it is the same. For though these three sorts of substances, as we term them, do not exclude one another out of the same place, yet we cannot conceive but that they must necessarily each of them exclude any of the same kind out of the same place; or else the notions and names of identity and diversity would be in vain, and there could be no such distinctions of substances, or anything else, one from another. For example, could two bodies be in the same place at the same time, then those two parcels of matter must be one and the same, take them great or little; nay, all bodies must be one and the same. For by the same reason that two particles of matter may be in one place, all bodies may be in one place; which, when it can be supposed, takes away the distinction of identity and diversity, of one and more, and renders it ridiculous. But it being a contradiction that two or more should be one, identity and diversity are relations and ways of comparing well-founded, and of use to the understanding. All other things being but modes or relations ultimately terminated in substances, the identity

and diversity of each particular existence of them too will be by the same way determined: only as to things whose existence is in succession, such as are the actions of finite beings, v. g., motion and thought, both which consist in a continued train of succession, concerning their diversity there can be no question: because, each perishing the moment it begins, they cannot exist in different times, or in different places, as permanent beings can at different times exist in distant places; and therefore no motion or thought, considered as at different times, can be the same, each part thereof having a different beginning of existence.

3. *Principium individuationis.*—From what has been said, it is easy to discover, what is so much inquired after, the *principium individuationis;* and that, it is plain, is existence itself, which determines a being of any sort to a particular time and place incommunicable to two beings of the same kind. This, though it seems easier to conceive in simple substances or modes, yet, when reflected on, is not more difficult in compound ones, if care be taken to what it is applied: v. g., let us suppose an atom, i. e. a continued body under one immutable superficies, existing in a determined time and place; it is evident that, considered in any instant of its existence, it is in that instant the same with itself. For, being at that instant what it is and nothing else, it is the same, and so must continue as long as its existence is continued; for so long it will be the same and no other. In like manner, if two or more atoms be joined together into the same mass, every one of those atoms will be the same, by the foregoing rule; and whilst they exist united together, the mass, consisting of the same atoms, must be the same mass, or the same body, let the parts be ever so differently jumbled: but if one of these atoms be taken away, or one new one added, it is no longer the same mass, or the same body. In the state of living creatures, their identity depends not on a mass of the same particles, but on something else. For in them the variation of great parcels of matter alters not the identity: an oak, growing from a plant to a great tree, and then lopped, is still the same oak; and a

colt, grown up to a horse, sometimes fat, sometimes lean, is all the while the same horse: though, in both these cases, there may be a manifest change of the parts; so that truly they are not either of them the same masses of matter, though there be truly one of them the same oak, and the other the same horse. The reason whereof is, that, in these two cases of a *mass of matter* and a *living body,* identity is not applied to the same thing.

4. *Identity of vegetables.*—We must therefore consider wherein an oak differs from a mass of matter; and that seems to me to be in this: That the one is only the cohesion of particles of matter any how united; the other such a disposition of them as constitutes the parts of an oak, and such an organization of those parts as is fit to receive and distribute nourishment, so as to continue and frame the wood, bark, and leaves, etc., of an oak, in which consists the vegetable life. That being then one plant which has such an organization of parts in one coherent body, partaking of one common life, it continues to be the same plant as long as it partakes of the same life, though that life be communicated to new particles of matter vitally united to the living plant in a like continued organization, conformable to that sort of plants. For this organization, being at any one instant in any one collection of matter, is in that particular concrete distinguished from all other, and is that individual life which existing constantly from that moment both forwards and backwards, in the same continuity of insensibly succeeding parts united to the living body of the plant, it has that identity which makes the same plant, and all the parts of it parts of the same plant, during all the time that they exist united in that continued organization, which is fit to convey that common life to all the parts so united.

5. *Identity of animals.*—The case is not so much different in brutes, but that anyone may hence see what makes an animal, and continues it the same. Something we have like this in machines, and may serve to illustrate it. For example, what is a watch? It is plain it is nothing but a fit organiza-

tion or construction of parts to a certain end, which, when a sufficient force is added to it, it is capable to attain. If we would suppose this machine one continued body, all whose organized parts were repaired, increased, or diminished, by a constant addition or separation of insensible parts, with one common life, we should have something very much like the body of an animal, with this difference—that in an animal the fitness of the organization, and the motion wherein life consists, begin together, the motion coming from within; but in machines, the force coming sensibly from without, is often away when the organ is in order, and well fitted to receive it.

6. *Identity of man.*—This also shows wherein the identity of the same *man* consists: viz., in nothing but a participation of the same continued life by constantly fleeting particles of matter, in succession vitally united to the same organized body. He that shall place the identity of man in any thing else but, like that of other animals, in one fitly organized body, taken in any one instant, and from thence continued under one organization of life in several successively fleeting particles of matter united to it, will find it hard to make an embryo, one of years, mad, and sober, the same man, by any supposition that will not make it possible for Seth, Ismael, Socrates, Pilate, St. Austin, and Cæsar Borgia, to be the same man. For if the identity of soul alone makes the same man, and there be nothing in the nature of matter why the same individual spirit may not be united to different bodies it will be possible that those men living in distant ages, and of different tempers, may have been the same man: which way of speaking must be from a very strange use of the word man, applied to an idea out of which body and shape is excluded. And that way of speaking would agree yet worse with the notions of those philosophers who allow of transmigration, and are of opinion that the souls of men may, for their miscarriages, be detruded into the bodies of beasts, as fit habitations, with organs suited to the satisfaction of their brutal inclinations. But yet, I think, nobody, could he be sure that

the soul of Heliogabalus were in one of his hogs, would yet say that hog were a man or Heliogabalus.

7. *Identity suited to the idea.*—It is not therefore unity of substance that comprehends all sorts of identity, or will determine it in every case; but, to conceive and judge of it aright, we must consider what idea the word it is applied to stands for: it being one thing to be the same substance, another the same man, and a third the same person, if person, man, and substance are three names standing for three different ideas. For such as is the idea belonging to that name, such must be the identity; which, if it had been a little more carefully attended to, would possibly have prevented a great deal of that confusion which often occurs about this matter, with no small seeming difficulties, especially concerning personal identity, which therefore we shall in the next place a little consider.

8. *Same man.*—An animal is a living organized body; and consequently the same animal, as we have observed, is the same continued life communicated to different particles of matter, as they happen successively to be united to that organized living body. And whatever is talked of other definitions, ingenious observation puts it past doubt, that the idea in our minds, of which the sound 'man,' in our mouths is the sign, is nothing else but of an animal of such a certain form: since I think I may be confident, that whoever should see a creature of his own shape or make, though it had no more reason all its life than a cat or a parrot, would call him still a man; or whoever should hear a cat or a parrot discourse, reason, and philosophize, would call or think it nothing but a cat or a parrot; and say, the one was a dull irrational man, and the other a very intelligent rational parrot. . . . For I presume it is not the idea of a thinking or rational being alone that makes the idea of a man in most people's sense, but of a body, so and so shaped, joined to it; and if that be the idea of a man, the same successive body not shifted all at once must, as well as the same immaterial spirit, go to the making of the same man.

9. *Personal identity.*—This being premised, to find where-

in personal identity consists, we must consider what *person* stands for; which I think, is a thinking intelligent being, that has reason and reflection, and can consider itself as itself, the same thinking thing, in different times and places; which it does only by that consciousness which is inseparable from thinking, and it seems to me essential to it: it being impossible for anyone to perceive, without perceiving that he does perceive. When we see, hear, smell, taste, feel, meditate, or will anything, we know that we do so. Thus it is always as to our present sensations and perceptions: and by this everyone is to himself that which he calls *self;* it not being considered, in this case, whether the same self be continued in the same or divers substances. For since consciousness always accompanies thinking, and it is that that makes everyone to be what he calls self, and thereby distinguishes himself from all other thinking things; in this alone consists personal identity, i. e. the sameness of a rational being: and as far as this consciousness can be extended backwards to any past action or thought, so far reaches the identity of that person; it is the same self now it was then; and it is by the same self with this present one that now reflects on it, that that action was done.

10. *Consciousness makes personal identity.*—But it is farther inquired whether it be the same identical substance. This, few would think they had reason to doubt of, if these perceptions, with their consciousness, always remained present in the mind, whereby the same thinking thing would be always consciously present, and, as would be thought, evidently the same to itself. But that which seems to make the difficulty is this, that this consciousness being interrupted always by forgetfulness, there being no moment of our lives wherein we have the whole train of all our past actions before our eyes in one view, but even the best memories losing the sight of one part whilst they are viewing another; and we sometimes, and that the greatest part of our lives, not reflecting on our past selves, being intent on our present thoughts, and in sound sleep having no thoughts at all, or at least none with that consciousness

which remarks our waking thoughts: I say, in all these cases, our consciousness being interrupted, and we losing the sight of our past selves, doubts are raised whether we are the same thinking thing, i. e. the same *substance,* or no. Which, however reasonable or unreasonable, concerns not personal identity at all: the question being, what makes the same *person,* and not whether it be the same identical substance which always thinks in the same person, which in this case matters not at all; different substances, by the same consciousness (where they do partake in it) being united into one person, as well as different bodies by the same life are united into one animal, whose identity is preserved, in that change of substance, by the unity of one continued life. For it being the same consciousness that makes a man be himself to himself, personal identity depends on that only, whether it be annexed solely to one individual substance, or can be continued in a succession of several substances. For as far as any intelligent being can repeat the idea of any past action with the same consciousness it had of it at first, and with the same consciousness it has of any present action; so far it is the same personal self. For it is by the consciousness it has of its present thoughts and actions that it is self to itself now, and so will be the same self, as far as the same consciousness can extend to actions past or to come; and would be by distance of time, or change of substance, no more two persons than a man be two men, by wearing other clothes today than he did yesterday, with a long or short sleep between: the same consciousness uniting those distant actions into the same person, whatever substance contributed to their production. . . . ]

[In the remainder of this chapter Locke pursues the argument for his thesis that personal identity depends on consciousness, not substance.

Chapter XXVIII, "Of Other Relations," is brief and unimportant.

Locke has now completed his "plain historical account" of the origin of our ideas. The remainder of Book II, Chapters XXIX–XXXIII, is of the nature of an appendix. In these chapters Locke discusses some practical considerations concerning ideas. He first treats (Chap. XXIX) of the distinction between clear and obscure, distinct and confused ideas. "Now every idea a man has being visibly what it is, and distinct from all other ideas but itself, that which makes it confused is, when it is such that it may as well be called by another name as that which it is expressed by; the difference which keeps the things (to be ranked under those two different names) distinct, and makes some of them belong rather to the one, and some of them to the other, of those names, being left out; and so the distinction, which was intended to be kept up by those different names, is quite lost."

In the next three chapters he considers three further distinctions in respect to ideas: real or fantastical, adequate or inadequate, and true or false. "By *real ideas,* I mean such as have a foundation in nature; such as have a conformity with the real being and existence of things, or with their archetypes. *Fantastical* or *chimerical,* I call such as have no foundation in nature, nor have any conformity with that reality of being to which they are tacitly referred as to their archetypes." Examining the several sorts of ideas in terms of this distinction, Locke finds that "our *simple ideas are all real,* all agree to the reality of things," no matter "whether they be only constant effects or else exact resemblances of something in the things themselves: the reality lying in that steady correspondence they have with the distinct constitutions of real beings. But whether they answer to those constitutions, as to causes or patterns, it matters not; it suffices that they are constantly produced by them." Mixed modes, made of consistent ideas, are real, since, "having no other reality but what they have in the minds of men, there is nothing more required to those kinds of ideas to make them real but that they be so framed that there be a possibility of existing conformable to them." And our "complex ideas of substances, being made all of them in reference to things existing without us, and intended to be representations of substances as they really are, are no farther real than as they are such combinations of simple ideas as are really united, and coexist in things without us." Real ideas may be adequate or inadequate. "Those I call *adequate* which perfectly represent those archetypes which the mind supposes them taken from; which it intends them to stand for, and to which it refers them. *Inadequate* ideas are such which are but a partial or incomplete representation of those archetypes to which they are referred." It is clear that simple ideas must all be adequate, and ideas of modes, taken in themselves, adequate, while our ideas of substances, as referred to real essences, are not adequate.

Truth and falsehood properly belong only to propositions, for "our ideas being nothing but bare appearances or perception in our minds, cannot properly and simply in themselves be said to be true or false, no more than a single name of anything can be said to be true or false." Yet whenever "the mind refers any of its ideas to anything extraneous to them, they are then capable to be called true or false. Because the mind in such a reference makes a tacit supposition of their conformity to that thing: which supposition, as it happens to be true or false, so the ideas themselves come to be denominated. The most usual cases wherein this happens are these following: First, When the mind supposes any idea it has conformable to that in other men's minds, called by the same common name; v. g., when the mind intends or judges its ideas of justice, temperance, religion, to be the same with what other men give those names to. Secondly, When the mind supposes any idea it has in itself to be conformable to some real existence." In the first case any of our ideas may be false, in the second "none of them can be termed false, but only our complex ideas of substances."

Chapter XXXIII, "Of the Association of Ideas," was added to the fourth edition. Locke does not use association as a general law of the connection of ideas in the way Hobbes had done, or as Hume and Hartley and their successors, were to do later; on the contrary, he sharply distinguishes the "natural correspondence and connection" of our ideas, from association, "another connection of ideas wholly owing to chance or custom," ideas that "in themselves are not at all of kin" and "not allied by nature." Thus the chapter is an essay in the pathology of thought. Locke gives practical advice on "the prevention and cure of these wrong and unnatural combinations of ideas."

The final paragraph of this chapter introduces the reader to the discussion in Book III, OF WORDS. "Having thus given an account of the original, sorts, and extent of our *ideas,* with several other considerations about these (I know not whether I may say) instruments, or materials of our knowledge, the method I at first proposed to myself would now require that I should immediately proceed to show, what use the understanding makes of them, and what *knowledge* we have by them. This was that which, in the first general view I had of this subject, was all that I thought I should have to do: but upon a nearer approach, I find that there is so close a connection between ideas and *words,* and our abstract ideas and general words have so constant a relation one to another, that it is impossible to speak clearly and distinctly of our knowledge, which all consists in propositions, without considering first the nature, use, and signification of language; which therefore must be the business of the next Book."

"The use of words is to be sensible marks of ideas, and the ideas they stand for are their proper and immediate signification." Though all things that exist are particulars, for the most part words are general; this "has not been the effect of neglect or chance, but of reason and necessity." For every particular thing to have a distinct peculiar name would be impossible, and "it would not serve to the chief end of language" which is communication. Communication involves general terms. How is it, then, that general words come to be made? "For since all things that exist are only particulars, how come we by general terms, or where find we those general natures they are supposed to stand for? Words become general by being made the signs of general ideas: and ideas become general by separating from them the circumstances of time and place, and any other ideas that may determine them to this or that particular existence. By this way of abstraction they are made capable of representing more individuals than one; each of which, having in it a conformity to that abstract idea, is (as we call it) of that sort." From this it follows that *"general* and *universal* belong not to the real existence of things; but are the inventions and creatures of the understanding, made by it for its own use, and concern only signs, whether words or ideas. Words are general, as has been said, when used for signs of general ideas; and so are applicable indifferently to many particular things: and ideas are general when they are set up as the representatives of many particular things: but universality belongs not to things themselves, which are all of them particular in their existence, even those words and ideas which in their signification are general. When therefore we quit particulars, the generals that rest are only creatures of our own making, their general nature being nothing but the capacity they are put into by the understanding of signifying or representing many particulars. For the signification they have is nothing but a relation that by the mind of man is added to them." While generals are the workmanship of the understanding they "have their foundation in the similitude of things," the understanding "taking occasion, from the similitude it observes amongst them, to make abstract general ideas, and set them up in the mind with names annexed to them, as patterns or forms (for in that sense the word form has a very proper signification), to which, as particular things existing are found to agree, so they come to be of that species, have that denomination, or are put into that *classis*. . . . And what are the essences of those species, set out and marked by names, but those abstract ideas in the mind; which are, as it were, the bonds between particular things that exist, and the names they are to be ranked under?"

*Essences,* then, are of two fundamentally distinct sorts: "First, essence may be taken for the being of anything, whereby it is what it is. And thus the real internal, but generally in substances unknown, constitution of things, whereon their discoverable qualities depend, may be called their essence. This is the proper original signification of the word, as is evident from the formation of it; *essentia,* in its primary notation, signifying properly being. And in this sense it is still used when we speak of the essence of particular things without giving them any name.

"Secondly, the learning and disputes of the schools having been much busied about *genus* and *species,* the word essence has almost lost its primary signification; and instead of the real constitution of things, has been almost wholly applied to the artificial constitution of *genus* and *species.* It is true, there is ordinarily supposed a real constitution of the sorts of things; and it is past doubt there must be some real constitution, on which any collection of simple ideas coexisting must depend. But it being evident that things are ranked under names into sorts or species only as they agree to certain abstract ideas to which we have annexed those names, the essence of each genus or sort comes to be nothing but that abstract idea, which the general or *sortal* (if I may have leave so to call it from sort, as I do general from *genus*) name stands for. And this we shall find to be that which the word essence imports in its most familiar use. These two sorts of essences, I suppose, may not unfitly be termed, the one the *real,* the other the *nominal,* essence. . . . Essences being thus distinguished into nominal and real, we may farther observe, that in the species of simple ideas and modes, they are always the same: but in substances, always quite different. Thus a figure including a space between three lines, is the real as well as nominal essence of a triangle; it being not only the abstract idea to which the general name is annexed, but the very *essentia,* or being of the thing itself, that foundation from which all its properties flow, and to which they are all inseparably annexed. But it is far otherwise concerning that parcel of matter which makes the ring on my finger, wherein these two essences are apparently different. For it is the real constitution of its insensible parts, on which depend all those properties of color, weight, fusibility, fixedness, etc., which makes it to be gold, or gives it a right to that name, which is therefore its nominal essence. Since nothing can be called gold but what has a conformity of qualities to that abstract complex idea to which that name is annexed. . . . This is that which in short I would say, viz., that all the great business of *genera* and *species,* and their essences, amounts to no more but this, that men making abstract ideas, and settling them in their minds, with names annexed to them, do thereby enable themselves to consider things, and discourse of them, as it were in bundles, for the easier and readier improvement and communication of their knowledge, which would advance but slowly, were their words and thoughts confined only to particulars."

Locke next treats (Chaps. IV–VI) of the names of simple ideas, of the names of mixed modes and relations, and of the names of substances. His chief points are: "Though all words, as I have shown, signify nothing immediately but the ideas in the mind of the speaker; yet upon a nearer survey, we shall find that the names of simple ideas, mixed modes (under which I comprise relations too), and natural substances, have each of them something peculiar, and different from the other. For example:

"First, the names of simple ideas and substances, with the abstract ideas in the mind which they immediately signify, intimate also some real existence, from which was derived their original pattern. But the names of *mixed modes* terminate in the idea that is in the mind, and lead not the thoughts any farther, as we shall see more at large in the following chapter.

"Secondly, the names of simple ideas and modes signify always the real as well as nominal essence of their species. But the names of natural substances signify rarely, if ever, anything but barely the nominal essences of those species, as we shall show in the chapter that treats of the names of substances in particular.

"Thirdly, the names of simple ideas are not capable of any definitions; the names of all complex ideas are."

In Chapter VI, "Of the Names of Substances," Locke develops the consequences of his distinction between real and nominal essence. In a letter to Molyneux Locke briefly restates the thesis of this chapter: "This I dare say: that there are real constitutions in things, from whence those simple ideas flow which we observe in them. And this I farther say: that there are real distinctions and differences in those real constitutions, one from another, whereby they are distinguished one from another, *whether we think of them, or name them, or no;* but that that whereby *we* distinguish and rank particular substances into sorts, is *not those real essences or inward constitutions,* but *such combinations of simple ideas as we observe in them.* This I designed to show in Lib. III, Chap. 6." (Quoted in A. C. Fraser's edition of the *Essay,* Vol. II, p. 87.)

The remaining chapters of Book III treat "Of Particles," "Of Abstract and Concrete Terms," "Of the Imperfection of Words," "Of the Abuse of Words," and "Of the Remedies of the Foregoing Imperfections and Abuses."]

## *BOOK IV: OF KNOWLEDGE AND PROBABILITY*

### CHAPTER I

### OF KNOWLEDGE IN GENERAL

1. *Our knowledge conversant about our ideas only.*—Since the mind, in all its thoughts and reasonings, hath no other immediate object but its own ideas, which it alone does or can contemplate, it is evident that our knowledge is only conversant about them.

2. *Knowledge is the perception of the agreement or disagreement of two ideas.*—Knowledge then seems to me to be nothing but the perception of the connection of and agreement, or disagreement and repugnancy, of any of our ideas. In this alone it consists. Where this perception is, there is

knowledge; and where it is not, there, though we may fancy, guess, or believe, yet we always come short of knowledge. For, when we know that white is not black, what do we else but perceive that these two ideas do not agree? When we possess ourselves with the utmost security of the demonstration that the three angles of a triangle are equal to two right ones, what do we more but perceive that equality to two right ones does necessarily agree to, and is inseparable from, the three angles of a triangle?

3. *This agreement fourfold.*—But, to understand a little more distinctly, wherein this agreement or disagreement consists, I think we may reduce it all to these four sorts: (i) Identity, or diversity. (ii) Relation. (iii) Coexistence, or necessary connection. (iv) Real existence.

4. (i) *Of identity or diversity.*—First, as to the first sort of agreement or disagreement, viz., *identity,* or *diversity.* It is the first act of the mind, when it has any sentiments or ideas at all, to perceive its ideas, and, so far as it perceives them, to know each what it is, and thereby also to perceive their difference, and that one is not another. This is so absolutely necessary, that without it there could be no knowledge, no reasoning, no imagination, no distinct thoughts at all. By this the mind clearly and infallibly perceives each idea to agree with itself, and to be what it is; and all distinct ideas to disagree, i. e., the one not to be the other: and this it does without pains, labor, or deduction, but at first view, by its natural power of perception and distinction. And though men of art have reduced this into those general rules, "What is, is," and, "It is impossible for the same thing to be and not to be," for ready application in all cases where in there may be occasion to reflect on it; yet it is certain that the first exercise of this faculty is about particular ideas. A man infallibly knows, as soon as ever he has them in his mind, that the ideas he calls 'white' and 'round' are the very ideas they are, and that they are not other ideas which he calls 'red' or 'square.' Nor can any maxim or proposition in the world make him know it clearer or surer than he did before and without any such gen-

eral rule. This, then, is the first agreement or disagreement which the mind perceives in its ideas, which it always perceives at first sight; and if there ever happen any doubt about it, it will always be found to be about the names, and not the ideas themselves, whose identity and diversity will always be perceived as soon and as clearly as the ideas themselves are, nor can it possibly be otherwise.

5. (ii) *Of relations.*—Secondly, the next sort of agreement or disagreement the mind perceives in any of its ideas may, I think, be called *relative,* and is nothing but the perception of the relation between any two ideas, of what kind soever, whether substances, modes, or any other. For, since all distinct ideas must eternally be known not to be the same, and so be universally and constantly denied one of another; there could be no room for any positive knowledge at all, if we could not perceive any relation between our ideas, and find out the agreement or disagreement they have one with another, in several ways the mind takes of comparing them.

6. (iii) *Of coexistence.*—Thirdly, the third sort of agreement or disagreement to be found in our ideas, which the perception of the mind is employed about, is *coexistence,* or *non-coexistence in the same subject;* and this belongs particularly to substances. Thus when we pronounce concerning gold that it is fixed, our knowledge of this truth amounts to no more but this, that fixedness, or a power to remain in the fire unconsumed, is an idea that always accompanies and is joined with that particular sort of yellowness, weight, fusibility, malleableness and solubility in *aqua regia,* which make our complex idea, signified by the word gold.

7. (iv) *Of real existence.*—Fourthly, the fourth and last sort is that of *actual real existence agreeing to any idea.* Within these four sorts of agreement or disagreement is, I suppose, contained all the knowledge we have or are capable of; for, all the inquiries that we can make concerning any of our ideas, all that we know or can affirm concerning any of them, is, that it is or is not the same with some other; that it does or does not always coexist with some other idea in the same subject;

that it has this or that relation to some other idea; or that it has a real existence without the mind. Thus, "Blue is not yellow," is of identity. "Two triangles upon equal bases between two parallels are equal," is of relation. "Iron is susceptible of magnetical impressions," is of coexistence. "God is," is of real existence. Though identity and coexistence are truly nothing but relations, yet they are such peculiar ways of agreement or disagreement of our ideas, that they deserve well to be considered as distinct heads, and not under relation in general; since they are so different grounds of affirmation and negation, as will easily appear to any one who will but reflect on what is said in several places of this *Essay*. I should now proceed to examine the several degrees of our knowledge, but that it is necessary first to consider the different acceptations of the word knowledge.

8. *Knowledge actual or habitual.*—There are several ways wherein the mind is possessed of truth, each of which is called knowledge.

(i) There is *actual knowledge,* which is the present view the mind has of the agreement or disagreement of any of its ideas, or of the relation they have one to another.

(ii) A man is said to know any proposition which having been once laid before his thoughts, he evidently perceived the agreement or disagreement of the ideas whereof it consists; and so lodged it in his memory, that, whenever that proposition comes again to be reflected on, he, without doubt or hesitation, embraces the right side, assents to and is certain of the truth of it. This, I think, one may call *habitual knowledge;* and thus a man may be said to know all those truths which are lodged in his memory by a foregoing clear and full perception, whereof the mind is assured past doubt as often as it has occasion to reflect on them. For, our finite understandings being able to think clearly and distinctly but on one thing at once, if men had no knowledge of any more than what they actually thought on, they would all be very ignorant; and he that knew most would know but one truth, that being all he was able to think on at one time.

9. *Habitual knowledge twofold.*—Of habitual knowledge there are also, vulgarly speaking, two degrees:—

First, the one is of such truths laid up in the memory as, whenever they occur to the mind, it actually perceives the relation is between those ideas. And this is in all those truths whereof we have an intuitive knowledge, where the ideas themselves, by an immediate view, discover their agreement or disagreement one with another.

Secondly, the other is of such truths whereof the mind having been convinced, it retains the memory of the conviction without the proofs. Thus a man that remembers certainly that he once perceived the demonstration that the three angles of a triangle are equal to two right ones, is certain that he knows it, because he cannot doubt the truth of it. In his adherence to a truth where the demonstration by which it was at first known is forgot, though a man may be thought rather to believe his memory than really to know, and this way of entertaining a truth seemed formerly to me like something between opinion and knowledge, a sort of assurance which exceeds bare belief, for that relies on the testimony of another; yet, upon a due examination, I find it comes not short of perfect certainty, and is, in effect, true knowledge. That which is apt to mislead our first thoughts into a mistake in this matter is, that the agreement or disagreement of the ideas in this case is not perceived, as it was at first, by an actual view of all the intermediate ideas whereby the agreement or disagreement of those in the proposition was at first perceived; but by other intermediate ideas, that show the agreement or disagreement of the ideas contained in the proposition whose certainty we remember. For example: in this proposition, that "the three angles of a triangle are equal to two right ones," one who has seen and clearly perceived the demonstration of this truth, knows it to be true, when that demonstration has gone out of his mind, so that at present it is not actually in view and possibly cannot be recollected; but he knows it in a different way from what he did before. The agreement of the two ideas joined in that proposition is perceived, but it is by the intervention of other ideas than those which at first produced that perception. He remembers, i. e., he knows (for remembrance is but the reviving of some past knowledge) that he was once certain of the truth of this proposition, that the three angles of a triangle are equal to two right ones. The immutability of the same relations between the same immutable things is now the idea that shows him that if the three angles of a triangle were once equal to two right ones, they will always be equal to two right ones. And hence he comes to be certain that what was once true in the case is always true; what ideas once agreed will always agree; and, consequently, what he once knew to be true he will always know to be true, as long as he can remember that he once knew it. Upon this ground it is that particular demonstrations in mathematics afford general knowledge. If, then, the perception that the same ideas will eternally have the same habitudes and relations be not a sufficient ground of knowledge, there could be no knowledge of general propositions in mathematics; for no mathematical demonstration would be any other than particular: and when a man had demonstrated any proposition concerning one triangle or circle, his knowledge would not reach beyond that particular diagram. If he would extend it farther, he must renew his demonstration in another instance before he could know it to be true in another like triangle, and so on: by which means one could never come to the knowledge of any general propositions. Nobody, I think, can deny that Mr. Newton certainly knows any proposition that he now at any time reads in his book to be true, though he has not in actual view that admirable chain of intermediate ideas whereby he at first discovered it to be true. Such a memory as that, able to retain such a train of particulars, may be well thought beyond the reach of human faculties, when the very discovery, perception, and laying together that wonderful connection of ideas is found to surpass most readers' comprehension. But yet it is evident the author himself knows the proposition to be true, remembering he once saw the connection of those ideas, as certainly as he knows such a man wounded another remembering that he saw him run him through. But because the memory is not always so clear as actual perception, and does in all men more or less decay in length of time, this amongst other differences, is one which shows that demonstrative knowledge is much more imperfect than intuitive as we shall see in the following chapter.

## CHAPTER II

## OF THE DEGREES OF OUR KNOWLEDGE

1. *Intuitive.*—All our knowledge consisting, as I have said, in the view the mind has of its own ideas, which is the utmost light and greatest certainty we, with our faculties and in our way of knowledge, are capable of, it may not be amiss to consider a little the degrees of its evidence. The different clearness of our knowledge seems to me to lie in the different way of perception the mind has of the agreement or disagreement of any of its ideas. For if we will reflect on our own ways of thinking, we will find that sometimes the mind perceives the agreement or disagreement of two ideas immediately by themselves, without the intervention of any other; and this, I think, we may call *intuitive knowledge.* For in this the mind is at no pains of proving or examining, but perceives the truth, as the eye doth light, only by being directed towards it. Thus the mind perceives that white is not black, that a circle is not a triangle, that three are more than two, and equal to one and two. Such kind of truths the mind perceives at the first sight of the ideas together, by bare intuition, without the intervention of any other idea; and this kind of knowledge is the clearest and most certain that human frailty is capable of. This part of knowledge is irresistible, and, like bright sunshine, forces itself immediately to be perceived as soon as ever the mind turns its view

that way; and leaves no room for hesitation, doubt or examination, but the mind is presently filled with the clear light of it. It is on this intuition that depends all the certainty and evidence of all our knowledge, which certainty everyone finds to be so great, that he cannot imagine, and therefore not require, a greater: for a man cannot conceive himself capable of a greater certainty, than to know that any idea in his mind is such as he perceives it to be; and that two ideas, wherein he perceives a difference, are different and not precisely the same. He that demands a greater certainty than this demands he knows not what, and shows only that he has a mind to be a sceptic without being able to be so. Certainty depends so wholly on this intuition, that in the next degree of knowledge, which I call demonstrative, this intuition is necessary in all the connections of the intermediate ideas, without which we cannot attain knowledge and certainty.

2. *Demonstrative.*—The next degree of knowledge is, where the mind perceives the agreement or disagreement of any ideas, but not immediately. Though wherever the mind perceives the agreement or disagreement of any of its ideas, there be certain knowledge; yet it does not always happen that the mind sees that agreement or disagreement which there is between them, even where it is discoverable; and in that case remains in ignorance, and at most gets no farther than a probable conjecture. The reason why the mind cannot always perceive presently the agreement or disagreement of two ideas, is, because those ideas concerning whose agreement or disagreement the inquiry is made, cannot by the mind be so put together as to show it. In this case then, when the mind cannot so bring its ideas together as, by their immediate comparison and, as it were, juxtaposition or application one to another, to perceive their agreement or disagreement, it is fain, *by the intervention of other ideas* (one or more, as it happens), to discover the agreement or disagreement which it searches; and this is that which we call *reasoning*. Thus the mind, being willing to know the agreement or disagreement in bigness between the three

angles of a triangle and two right ones, cannot, by an immediate view and comparing them, do it: because the three angles of a triangle cannot be brought at once, and be compared with any one or two angles; and so of this the mind has no immediate, no intuitive knowledge. In this case the mind is fain to find out some other angles, to which the three angles of a triangle have an equality; and finding those equal to two right ones, comes to know their equality to two right ones.

3. *Depends on proofs.*—Those intervening ideas which serve to show the agreement of any two others, are called *proofs;* and where the agreement or disagreement is by this means plainly and clearly perceived, it is called *demonstration,* it being *shown* to the understanding, and the mind made to see that it is so. A quickness in the mind to find out these intermediate ideas (that shall discover the agreement or disagreement of any other), and to apply them right, is, I suppose, that which is called *sagacity.*

4. *But not so easy as intuitive knowledge.*—This knowledge by intervening proofs though it be certain, yet the evidence of it is not altogether so clear and bright, nor the assent so ready, as in intuitive knowledge. For though in demonstration the mind does at last perceive the agreement or disagreement of the ideas it considers, yet it is not without pains and attention: there must be more than one transient view to find it. A steady application and pursuit are required to this discovery; and there must be a progression by steps and degrees before the mind can in this way arrive at certainty, and come to perceive the agreement or repugnancy between two ideas that need proofs and the use of reason to show it.

5. *Not without precedent doubt.*—Another difference between intuitive and demonstrative knowledge, is, that though in the latter all doubt be removed, when by the intervention of the intermediate ideas the agreement or disagreement is perceived; yet before the demonstration there was a doubt; which in intuitive knowledge cannot happen to the mind

that has its faculty of perception left to a degree capable of distinct ideas, no more than it can be a doubt to the eye (that can distinctly see white and black), whether this ink and this paper be all of a color. If there be sight in the eyes, it will at first glimpse, without hesitation, perceive the words printed on this paper, different from the color of the paper: and so, if the mind have the faculty of distinct perception, it will perceive the agreement or disagreement of those ideas that produce intuitive knowledge. If the eyes have lost the faculty of seeing, or the mind of perceiving, we in vain inquire after the quickness of sight in one, or clearness of perception in the other.

6. *Not so clear.*—It is true, the perception produced by demonstration is also very clear; yet it is often with a great abatement of that evident luster and full assurance that always accompany that which I call intuitive; like a face reflected by several mirrors one to another, where, as long as it retains the similitude and agreement with the object, it produces a knowledge; but it is still in every successive reflection with a lessening of that perfect clearness and distinctness which is in the first, till at last, after many removes, it has a great mixture of dimness, and is not at first sight so knowable, especially to weak eyes. Thus it is with knowledge made out by a long train of proof.

7. *Each step must have intuitive evidence.*—Now, in every step reason makes in demonstrative knowledge, there is an intuitive knowledge of that agreement or disagreement it seeks with the next intermediate idea, which it uses as a proof: for if it were not so, that yet would need a proof; since without the perception of such agreement or disagreement there is no knowledge produced. If it be perceived by itself, it is intuitive knowledge; if it cannot be perceived by itself, there is need of some intervening idea, as a common measure, to show their agreement or disagreement. By which it is plain that every step in reasoning that produces knowledge has intuitive certainty; which when the mind perceives, there is no more required but to remember it, to make the agreement

or disagreement of the ideas concerning which we inquire, visible and certain. So that to make anything a demonstration, it is necessary to perceive the immediate agreement of the intervening ideas, whereby the agreement or disagreement of the two ideas under examination (whereof the one is always the first, and the other the last in the account) is found. This intuitive perception of the agreement or disagreement of the intermediate ideas, in each step and progression of the demonstration, must also be carried exactly in the mind, and a man must be sure that no part is left out: which, because in long deductions, and the use of many proofs, the memory does not always so readily and exactly retain; therefore, it comes to pass, that this is more imperfect than intuitive knowledge, and men embrace often falsehood for demonstrations.

8. *Hence the mistake, 'ex præcognitis et præconcessis.'*—The necessity of this intuitive knowledge, in each step of scientifical or demonstrative reasoning, gave occasion, I imagine, to that mistaken axiom, that all reasoning was *ex præcognitis et præconcessis;* which, how far it is a mistake, I shall have occasion to show more at large when I come to consider propositions, and particularly those propositions which are called maxims; and to show that it is by a mistake that they are supposed to be the foundations of all our knowledge and reasonings.

9. *Demonstration not limited to quantity.*—[It has been generally taken for granted that mathematics alone are capable of demonstrative certainty; but to have such an agreement or disagreement as may intuitively be perceived, being, as I imagine, not the privilege of the ideas of number, extension, and figure alone, it may possibly be the want of due method and application in us, and not of sufficient evidence in things, that demonstration has been thought to have so little to do in other parts of knowledge, and been scarce so much as aimed at by any but mathematicians.] For, whatever ideas we have wherein the mind can perceive the immediate agreement or disagreement that is between them,

there the mind is capable of intuitive knowledge; and where it can perceive the agreement or disagreement of any two ideas, by an intuitive perception of the agreement or disagreement they have with any intermediate ideas, there the mind is capable of demonstration, which is not limited to ideas of extension, figure, number, and their modes.

10. *Why it has been so thought.*—The reason why it has been generally sought for and supposed to be only in those, I imagine, has been not only the general usefulness of those sciences, but because, in comparing their equality or excess, the modes of numbers have every the least difference very clear and perceivable: and though in extension every the least excess is not so perceptible, yet the mind has found out ways to examine and discover demonstratively the just equality of two angles, or extensions, or figures; and both these, i. e., numbers and figures, can be set down by visible and lasting marks, wherein the ideas under consideration are perfectly determined; which for the most part they are not, where they are marked only by names and words.

11. But in other simple ideas, whose modes and differences are made and counted by degrees, and not quantity, we have not so nice and accurate a distinction of their differences as to perceive or find ways to measure their just equality or the least differences. For, those other simple ideas being appearances of sensations produced in us by the size, figure, number, and motion of minute corpuscles singly insensible, their different degrees also depend upon the variation of some or all of those causes; which, since it cannot be observed by us in particles of matter whereof each is too subtile to be perceived, it is impossible for us to have any exact measures of the different degrees of these simple ideas. For, supposing the sensation or idea we name whiteness be produced in us by a certain number of globules, which, having a verticity about their own centers, strike upon the *retina* of the eye with a certain degree of rotation, as well as progressive swiftness; it will hence easily follow that the more the superficial parts of any body are so ordered as to reflect the

greater number of globules of light, and to give them the proper rotation which is fit to produce this sensation of white in us, the more white will that body appear that from an equal space sends to the *retina* the greater number of such corpuscles with that peculiar sort of motion. I do not say, that the nature of light consists in very small round globules, nor of whiteness in such a texture of parts as gives a certain rotation to these globules when it reflects them; for I am not now treating physically of light or colors; but this I think I may say, that I cannot (and I would be glad any one would make intelligible that he did) conceive how bodies without us can any ways affect our senses but by the immediate contact of the sensible bodies themselves, as in tasting and feeling, or the impulse of some sensible particles coming from them, as in seeing, hearing, and smelling; by the different impulse of which parts, caused by their different size, figure, and motion, the variety of sensations is produced in us.

12. Whether then they be globules or no; or whether they have a verticity about their own centers that produces the idea of whiteness in us; this is certain, that the more particles of light are reflected from a body, fitted to give them that peculiar motion which produces the sensation of whiteness in us, and possibly, too, the quicker that peculiar motion is, the whiter does the body appear from which the greatest number are reflected, as is evident in the same piece of paper put in the sunbeams, in the shade, and in a dark hole; in each of which it will produce in us the idea of whiteness in far different degrees.

13. Not knowing therefore what number of particles, nor what motion of them, is fit to produce any precise degree of whiteness, we cannot demonstrate the certain equality of any two degrees of whiteness; because we have no certain standard to measure them by, nor means to distinguish every the least real difference; the only help we have being from our senses, which in this point fail us. But where the difference is so great as to produce in the mind clearly distinct ideas, whose differences can be perfectly retained, there these ideas

of colors, as we see in different kinds, as blue and red, are as capable of demonstration as ideas of number and extension. What I have here said of whiteness and colors, I think, holds true in all secondary qualities and their modes.

14. *Sensitive knowledge of particular existence.*—These two, viz. intuition and demonstration, are the degrees of our knowledge; whatever comes short of one of these, with what assurance soever embraced, is but faith or opinion, but not knowledge, at least in all general truths. There is, indeed, another perception of the mind employed about the particular existence of finite beings without us; which, going beyond bare probability, and yet not reaching perfectly to either of the foregoing degrees of certainty, passes under the name of knowledge. There can be nothing more certain than that the idea we receive from an external object is in our minds: this is intuitive knowledge. But whether there be anything more than barely that idea in our minds, whether we can thence certainly infer the existence of anything without us which corresponds to that idea, is that whereof some men think there may be a question made; because men may have such ideas in their minds when no such thing exists, no such object affects their senses. But yet here, I think, we are provided with an evidence that puts us past doubting; for I ask anyone whether he be not invincibly conscious to himself of a different perception when he looks on the sun by day, and thinks on it by night; when he actually tastes wormwood, or smells a rose, or only thinks on that savor or odor? We as plainly find the difference there is between any idea revived in our minds by our own memory, and actually coming into our minds by our senses, as we do between any two distinct ideas. If anyone say, "A dream may do the same thing, and all these ideas may be produced in us without any external objects;" he may please to dream that I make him this answer: (i) That it is no great matter whether I remove his scruple or no; where all is but dream, reasoning and arguments are of no use, truth and knowledge nothing. (ii) That I believe he will allow a very manifest difference

between dreaming of being in the fire, and being actually in it. But yet if he be resolved to appear so sceptical as to maintain that what I call 'being actually in the fire' is nothing but a dream, and that we cannot thereby certainly know that any such thing as fire actually exists without us; I answer that we certainly finding that pleasure or pain follows upon the application of certain objects to us, whose existence we perceive, or dream that we perceive, by our senses; this certainty is as great as our happiness or misery, beyond which we have no concernment to know or to be. So that, I think, we may add to the two former sorts of knowledge this also, of the existence of particular external objects by that perception and consciousness we have of the actual entrance of ideas from them, and allow these three degrees of knowledge, viz., intuitive, demonstrative, and sensitive; in each of which there are different degrees and ways of evidence and certainty.

15. *Knowledge not always clear where the ideas are so.*—But since our knowledge is founded on and employed about our ideas only, will it not follow from thence that it is conformable to our ideas; and that where our ideas are clear and distinct, or obscure and confused, our knowledge will be so too? To which I answer, No: for our knowledge consisting in the perception of the agreement or disagreement of any two ideas, its clearness or obscurity consists in the clearness or obscurity of that perception, and not in the clearness or obscurity of the ideas themselves: v. g., a man that has as clear ideas of the angles of a triangle, and of equality to two right ones, as any mathematician in the world, may yet have but a very obscure perception of their agreement, and so have but a very obscure knowledge of it. [But ideas which by reason of their obscurity or otherwise are confused, cannot produce any clear or distinct knowledge; because as far as any ideas are confused, so far the mind cannot perceive clearly whether they agree or disagree. Or, to express the same thing in a way less apt to be misunderstood, he that hath not determined ideas to the words he uses cannot make propositions of them, of whose truth he can be certain.]

# CHAPTER III

## OF THE EXTENT OF HUMAN KNOWLEDGE

1. KNOWLEDGE, as has been said, lying in the perception of the agreement or disagreement of any of our ideas, it follows from hence that,

(i) *No farther than we have ideas.*—First, we can have knowledge no farther than we have ideas.

2. (ii) *No farther than we can perceive their agreement or disagreement.*—Secondly, that we can have no knowledge farther than we can have perception of that agreement or disagreement: which perception being, (1) either by intuition, or the immediate comparing any two ideas, or (2) by reason, examining the agreement or disagreement of two ideas by the intervention of some others, or, (3) by sensation, perceiving the existence of particular things; hence it also follows,

3. (iii) *Intuitive knowledge extends itself not to all the relations of all our ideas.*—Thirdly, that we cannot have an intuitive knowledge that shall extend itself to all our ideas, and all that we would know about them; because we cannot examine and perceive all the relations they have one to another by juxtaposition, or an immediate comparison one with another. Thus having the ideas of an obtuse and an acute-angled triangle, both drawn from equal bases and between parallels, I can by intuitive knowledge perceive the one not to be the other, but cannot that way know whether they be equal or no: because their agreement or disagreement in equality can never be perceived by an immediate comparing them; the difference of figure makes their parts incapable of an exact immediate application; and therefore there is need of some intervening qualities to measure them by, which is demonstration or rational knowledge.

4. (iv) *Nor demonstrative knowledge.*—Fourthly, it follows also, from what is above observed, that our rational knowledge cannot reach to the whole extent of our ideas:

because between two different ideas we would examine, we cannot always find such mediums as we can connect one to another with an intuitive knowledge, in all the parts of the deduction; and wherever that fails, we come short of knowledge and demonstration.

5. (v) *Sensitive knowledge narrower than either.*—Fifthly, sensitive knowledge, reaching no farther than the existence of things actually present to our senses, is yet much narrower than either of the former.

6. (vi) *Our knowledge therefore narrower than our ideas.*—From all which it is evident that the extent of our knowledge comes not only short of the reality of things, but even of the extent of our own ideas. Though our knowledge be limited to our ideas, and cannot exceed them either in extent or perfection; and though these be very narrow bounds in respect of the extent of all Being, and far short of what we may justly imagine to be in some even created understandings not tied down to the dull and narrow information that is to be received from some few and not very acute ways of perception, such as are our senses; yet it would be well with us if our knowledge were but as large as our ideas, and there were not many doubts and inquiries concerning the ideas we have, whereof we are not, nor I believe ever shall be in this world, resolved. Nevertheless, I do not question but that human knowledge, under the present circumstances of our beings and constitutions, may be carried much farther than it hitherto has been, if men would sincerely, and with freedom of mind, employ all that industry and labor of thought in improving the means of discovering truth which they do for the coloring or support of falsehood, to maintain a system, interest, or party they are once engaged in. But yet, after all, I think I may, without injury to human perfection, be confident that our knowledge would never reach to all we might desire to know concerning those ideas we have; nor be able to surmount all the difficulties, and resolve all the questions that might arise concerning any of them. We have the ideas of a square, a circle, and equality; and yet, perhaps,

shall never be able to find a circle equal to a square, and certainly know that it is so. We have the ideas of matter and thinking, but possibly shall never be able to know whether [any mere material being] thinks or no; it being impossible for us, by the contemplation of our own ideas without revelation, to discover whether Omnipotency has not given to some systems of matter, fitly disposed, a power to perceive and think, or else joined and fixed to matter, so disposed, a thinking immaterial substance: it being, in respect of our notions, not much more remote from our comprehension to conceive that God can, if He pleases, superadd to matter a faculty of thinking, than that He should superadd to it another substance with a faculty of thinking; since we know not wherein thinking consists, nor to what sort of substances the Almighty has been pleased to give that power which cannot be in any created being but merely by the good pleasure and bounty of the Creator. . . .

But, to return to the argument in hand: our knowledge, I say, is not only limited to the paucity and imperfections of the ideas we have, and which we employ it about, but even comes short of that, too: but how far it reaches, let us now inquire.

7. *How far our knowledge reaches.*—The affirmations or negations we make concerning the ideas we have, may, as I have before intimated in general, be reduced to these four sorts, viz., identity, coexistence, relation, and real existence. I shall examine how far our knowledge extends in each of these:—

8. (i) *Our knowledge of identity and diversity, as far as our ideas.*—First, as to identity and diversity, in this way of the agreement or disagreement of ideas, our intuitive knowledge is as far extended as our ideas themselves; and there can be no idea in the mind which it does not presently, by an intuitive knowledge, perceive to be what it is, and to be different from any other.

9. (ii) *Of coexistence, a very little way.*—Secondly, as to the second sort, which is the agreement or disagreement of our ideas in coexistence, in this our knowledge is very short,

though in this consists the greatest and most material part of our knowledge concerning substances. For our ideas of the species of substances being, as I have showed, nothing but certain collections of simple ideas united in one subject, and so coexisting together; v. g., our idea of flame is a body hot, luminous, and moving upward; of gold, a body heavy to a certain degree, yellow, malleable, and fusible. These, or some such complex ideas as these in men's minds, do these two names of the different substances, flame and gold, stand for. When we would know anything farther concerning these, or any other sort of substances, what do we inquire but what other qualities or powers these substances have or have not? Which is nothing else but to know what other simple ideas do or do not coexist with those that make up that complex idea.

10. *Because the connection between most simple ideas is unknown.*—This, how weighty and considerable a part soever of human science, is yet very narrow, and scarce any at all. The reason whereof is, that the simple ideas whereof our complex ideas of substances are made up are, for the most part, such as carry with them, in their own nature, no visible necessary connection or inconsistency with any other simple ideas, whose coexistence with them we would inform ourselves about.

11. *Especially of secondary qualities.*—The ideas that our complex ones of substances are made up of, and about which our knowledge concerning substances is most employed, are those of their secondary qualities; which depending all (as has been shown) upon the primary qualities of their minute and insensible parts, or, if not upon them, upon something yet more remote from our comprehension, it is impossible we should know which have a necessary union or inconsistency one with another: for, not knowing the root they spring from, not knowing what size, figure, and texture of parts they are on which depend and from which result those qualities which make our complex idea of gold, it is impossible we should know what other qualities result from or are incom-

patible with the same constitution of the insensible parts of gold; and so, consequently, must always coexist with that complex idea we have of it, or else are inconsistent with it.

12. *Because all connection between any secondary and primary qualities is undiscoverable.*—Besides this ignorance of the primary qualities of the insensible parts of bodies, on which depend all their secondary qualities, there is yet another and more incurable part of ignorance, which sets us more remote from a certain knowledge of the coexistence or in-coexistence (if I may so say) of different ideas in the same subject; and that is, that there is no discoverable connection between any secondary quality and those primary qualities that it depends on.

13. That the size, figure, and motion of one body should cause a change in the size, figure, and motion of another body, is not beyond our conception. The separation of the parts of one body upon the intrusion of another, and the change from rest to motion upon impulse; these, and the like, seem to have some connection one with another. And if we knew these primary qualities of bodies, we might have reason to hope we might be able to know a great deal more of these operations of them one upon another; but our minds not being able to discover any connection betwixt these primary qualities of bodies and the sensations that are produced in us by them, we can never be able to establish certain and undoubted rules of the consequence or coexistence of any secondary qualities, though we could discover the size, figure, or motion of those invisible parts which immediately produce them. We are so far from knowing what figure, size, or motion of parts produce a yellow color, a sweet taste, or a sharp sound, that we can by no means conceive how any size, figure, or motion of any particles can possibly produce in us the idea of any color, taste, or sound whatsoever; there is no conceivable connection between the one and the other.

14. In vain, therefore, shall we endeavor to discover by our ideas (the only true way of certain and universal knowledge) what other ideas are to be found constantly joined

with that of our complex idea of any substance: since we neither know the real constitution of the minute parts on which their qualities do depend; nor, did we know them, could we discover any necessary connection between them and any of the secondary qualities; which is necessary to be done before we can certainly know their necessary coexistence. So that, let our complex idea of any species of substances be what it will, we can hardly, from the simple ideas contained in it, certainly determine the necessary coexistence of any other quality whatsoever. Our knowledge in all these inquiries reaches very little farther than our experience. Indeed some few of the primary qualities have a necessary dependence and visible connection one with another, as figure necessarily supposes extension, receiving or communicating motion by impulse supposes solidity. But though these and perhaps some others of our ideas have, yet there are so few of them that have, a visible connection one with another, that we can by intuition or demonstration discover the coexistence of very few of the qualities that are to be found united in substances; and we are left only to the assistance of our senses to make known to us what qualities they contain. For of all the qualities that are coexistent in any subject, without this dependence and evident connection of their ideas one with another, we cannot know certainly any two to coexist any farther than experience, by our senses, informs us. Thus though we see the yellow color, and upon trial find the weight, malleableness, fusibility, and fixedness that are united in a piece of gold; yet, because no one of these ideas has any evident dependence or necessary connection with the other, we cannot certainly know that where any four of these are the fifth will be there also, how highly probable soever it may be; because the highest probability amounts not to certainty, without which there can be no true knowledge. For this coexistence can be no farther known than it is perceived; and it cannot be perceived but either in particular subjects by the observation of our senses, or in general by the necessary connection of the ideas themselves.

15. *Of repugnancy to coexist, larger.*—As to incompatibility or repugnancy to coexistence, we may know that any subject may have of each sort of primary qualities but one particular at once: v. g., each particular extension, figure, number of parts, motion, excludes all other of each kind. The like also is certain of all sensible ideas peculiar to each sense; for whatever of each kind is present in any subject, excludes all other of that sort: v. g., no one subject can have two smells or two colors at the same time. To this, perhaps, will be said, "Has not an opal, or the infusion of *lignum nephriticum,* two colors at the same time?" To which I answer, that these bodies to eyes differently placed, may at the same time afford different colors; but I take liberty also to say that to eyes differently placed it is different parts of the object that reflect the particles of light; and therefore it is not the same part of the object, and so not the very same subject, which at the same time appears both yellow and azure. For it is as impossible that the very same particle of any body should at the same time differently modify or reflect the rays of light, as that it should have two different figures and textures at the same time.

16. *Of the coexistence of powers, a very little way.*—But as to the power of substances to change the sensible qualities of other bodies, which makes a great part of our inquiries about them, and is no inconsiderable branch of our knowledge; I doubt, as to these, whether our knowledge reaches much farther than our experience; or whether we can come to the discovery of most of these powers, and be certain that they are in any subject, by the connection with any of those ideas which to us make its essence. Because the active and passive powers of bodies, and their ways of operating, consisting in a texture and motion of parts which we cannot by any means come to discover, it is but in very few cases we can be able to perceive their dependence on or repugnance to any of those ideas which make our complex one of that sort of things. I have here instanced in the corpuscularian hypothesis, as that which is thought to go farthest in an intelligible

explication of those qualities of bodies; and I fear the weakness of human understanding is scarce able to substitute another, which will afford us a fuller and clearer discovery of the necessary connection and coexistence of the powers which are to be observed united in several sorts of them. This at least is certain, that whichever hypothesis be clearest and truest (for of that it is not my business to determine), our knowledge concerning corporeal substances will be very little advanced by any of them, till we are made to see what qualities and powers of bodies have a necessary connection or repugnancy one with another; which, in the present state of philosophy, I think, we know but to a very small degree: and I doubt whether, with those faculties we have, we shall ever be able to carry our general knowledge (I say not particular experience) in this part much farther. [Experience is that which in this part we must depend on. And it were to be wished that it were more improved. We find the advantages some men's generous pains have this way brought to the stock of natural knowledge. And if others, especially the philosophers by fire, who pretend to it, had been so wary in their observations and sincere in their reports as those who call themselves philosophers ought to have been, our acquaintance with the bodies here about us, and our insight into their powers and operations, had been yet much greater.]

17. *Of spirits yet narrower.*—If we are at a loss in respect of the powers and operations of bodies, I think it is easy to conclude we are much more in the dark in reference to spirits, whereof we naturally have no ideas but what we draw from that of our own, by reflecting on the operations of our own souls within us, as far as they can come within our observation. But how inconsiderable a rank the spirits that inhabit our bodies hold amongst those various, and possibly innumerable, kinds of nobler beings; and how far short they come of the endowments and perfections of cherubims and seraphims, and infinite sorts of spirits above us, is what by a transient hint, in another place, I have offered to my reader's consideration.

18. (iii) *Of other relations, it is not easy to say how far.*—As to the third sort of our knowledge, viz., the agreement or disagreement of any of our ideas in any other relation: this, as it is the largest field of our knowledge, so it is hard to determine how far it may extend; because the advances that are made in this part of knowledge depending on our sagacity in finding intermediate ideas that may show the relations and habitudes of ideas, whose coexistence is not considered, it is a hard matter to tell when we are at an end of such discoveries, and when reason has all the helps it is capable of for the finding of proofs, or examining the agreement or disagreement of remote ideas. They that are ignorant of algebra, cannot imagine the wonders in this kind are to be done by it: and what farther improvements and helps, advantageous to other parts of knowledge, the sagacious mind of man may yet find out, it is not easy to determine. This at least I believe, that the ideas of quantity are not those alone that are capable of demonstration and knowledge; and that other, and perhaps more useful, parts of contemplation would afford us certainty, if vices, passions, and domineering interest did not oppose or menace such endeavors. . . .

21. (iv) *Of real existence.*—Fourthly, as to the fourth sort of our knowledge, viz., of the real actual existence of things, we have an *intuitive* knowledge of our own existence; and a *demonstrative* knowledge of the existence of a God; of the existence of anything else, we have no other but a *sensitive* knowledge, which extends not beyond the objects present to our senses.

## CHAPTER IV

## OF THE REALITY OF HUMAN KNOWLEDGE

1. *Objection. Knowledge placed in ideas may be all bare vision.*—I doubt not but my reader by this time may be apt to think that I have been all this while only building a castle in the air; and be ready to say to me, "To what purpose all

this stir? 'Knowledge,' say you, 'is only the perception of the agreement or disagreement of our own ideas;' but who knows what those ideas may be? Is there anything so extravagant as the imaginations of men's brains? Where is the head that has no chimeras in it? Or if there be a sober and a wise man, what difference will there be, by your rules, between his knowledge, and that of the most extravagant fancy in the world? They both have their ideas, and perceive their agreement and disagreement one with another. If there be any difference between them, the advantage will be on the warm-headed man's side, as having the more ideas, and the more lively. And so, by your rules, he will be the more knowing. If it be true that all knowledge lies only in the perception of the agreement or disagreement of our own ideas, the visions of an enthusiast, and the reasonings of a sober man, will be equally certain. It is no matter how things are: so a man observe but the agreement of his own imaginations, and talk conformably, it is all truth, all certainty. Such castles in the air will be as strongholds of truth as the demonstrations of Euclid. That an harpy is not a centaur, is by this way as certain knowledge, and as much a truth, as that a square is not a circle.

"But of what use is all this fine knowledge of men's own imaginations to a man that inquires after the reality of things? It matters not what men's fancies are, it is the knowledge of things that is only to be prized; it is this alone gives a value to our reasonings, and preference to one man's knowledge over another's, that it is of things as they really are, and not of dreams and fancies."

2. *Answer. Not so where ideas agree with things.*—To which I answer, that if our knowledge of our ideas terminate in them, and reach no farther, where there is something farther intended, our most serious thoughts will be of little more use than the reveries of a crazy brain; and the truths built thereon of no more weight than the discourses of a man who sees things clearly in a dream, and with great assurance utters them. But I hope before I have done to make

it evident that this way of certainty, by the knowledge of our own ideas, goes a little farther than bare imagination; and I believe it will appear that all the certainty of general truths a man has lies in nothing else.

3. It is evident the mind knows not things immediately, but only by the intervention of the ideas it has of them. Our knowledge therefore is real only so far as there is a conformity between our ideas and the reality of things. But what shall be here the criterion? How shall the mind, when it perceives nothing but its own ideas, know that they agree with things themselves? This, though it seems not to want difficulty, yet I think there be two sorts of ideas that we may be assured agree with things.

4. *As* (i) *all simple ideas do.*—First, the first are simple ideas, which since the mind, as has been showed, can by no means make to itself, must necessarily be the product of things operating on the mind in a natural way, and producing therein those perceptions which by the wisdom and will of our Maker they are ordained and adapted to. From whence it follows that simple ideas are not fictions of our fancies, but the natural and regular productions of things without us really operating upon us, and so carry with them all the conformity which is intended, or which our state requires; for they represent to us things under those appearances which they are fitted to produce in us, whereby we are enabled to distinguish the sorts of particular substances, to discern the states they are in, and so to take them for our necessities, and apply them to our uses. Thus the idea of whiteness or bitterness, as it is in the mind, exactly answering that power which is in any body to produce it there, has all the real conformity it can or ought to have with things without us. And this conformity between our simple ideas and the existence of things is sufficient for real knowledge.

5. (ii) *All complex ideas except of substances.*—Secondly, all our complex ideas except those of substances being archetypes of the mind's own making, not intended to be the copies of anything, nor referred to the existence of any thing,

as to their originals, cannot want any conformity necessary to real knowledge. For that which is not designed to represent anything but itself, can never be capable of a wrong representation, nor mislead us from the true apprehension of any thing by its dislikeness to it; and such, excepting those of substances, are all our complex ideas: which, as I have showed in another place, are combinations of ideas which the mind by its free choice puts together without considering any connection they have in nature. And hence it is, that in all these sorts the ideas themselves are considered as the archetypes, and things no otherwise regarded but as they are conformable to them. So that we cannot but be infallibly certain that all the knowledge we attain concerning these ideas is real, and reaches things themselves; because in all our thoughts, reasonings, and discourses of this kind, we intend things no farther than as they are conformable to our ideas. So that in these we cannot miss of a certain and undoubted reality.

6. *Hence the reality of mathematical knowledge.*—I doubt not but it will be easily granted that the knowledge we have of mathematical truths, is not only certain but real knowledge, and not the bare empty vision of vain, insignificant chimeras of the brain; and yet, if we will consider, we shall find that it is only of our own ideas. The mathematician considers the truth and properties belonging to a rectangle or circle, only as they are in idea in his own mind. For it is possible he never found either of them existing mathematically, i. e. precisely true, in his life. But yet the knowledge he has of any truths or properties belonging to a circle, or any other mathematical figure, are never the less true and certain even of real things existing; because real things are no farther concerned, nor intended to be meant by any such propositions, than as things really agree to those archetypes in his mind. Is it true of the idea of a triangle, that its three angles are equal to two right ones? It is true also of a triangle wherever it really exists. Whatever other figure exists, that it is not exactly answerable to that idea of a triangle in his mind, is not at all concerned

in that proposition. And therefore he is certain all his knowledge concerning such ideas is real knowledge: because, intending things no farther than they agree with those his ideas, he is sure what he knows concerning those figures when they have barely an ideal existence in his mind, will hold true of them also when they have a real existence in matter; his consideration being barely of those figures, which are the same wherever or however they exist.

7. *And of moral.*—And hence it follows that moral knowledge is as capable of real certainty as mathematics. For certainty being but the perception of the agreement or disagreement of our ideas, and demonstration nothing but the perception of such agreement by the intervention of other ideas or mediums, our moral ideas as well as mathematical being archetypes themselves, and so adequate and complete ideas, all the agreement or disagreement which we shall find in them will produce real knowledge, as well as in mathematical figures.

8. *Existence not required to make it real.*—[For the attaining of knowledge and certainty, it is requisite that we have determined ideas:] and to make our knowledge real, it is requisite that the ideas answer their archetypes. Nor let it be wondered that I place the certainty of our knowledge in the consideration of our ideas with so little care and regard (as it may seem) to the real existence of things: since most of those discourses which take up the thoughts and engage the disputes of those who pretend to make it their business to inquire after truth and certainty, will, I presume, upon examination, be found to be general propositions and notions in which existence is not at all concerned. All the discourses of the mathematicians about the squaring of a circle, conic sections, or any other part of mathematics, concern not the existence of any of those figures; but their demonstrations, which depend on their ideas, are the same, whether there be any square or circle existing in the world, or no. In the same manner, the truth and certainty of moral discourses abstracts from the lives of men, and the existence of those virtues in the

world whereof they treat; nor are Tully's *Offices* less true because there is nobody in the world that exactly practises his rules, and lives up to that pattern of a virtuous man which he has given us, and which existed nowhere when he writ but in idea. If it be true in speculation, i. e. in idea, that murder deserves death, it will also be true in reality of any action that exists conformable to that idea of murder. As for other actions, the truth of that proposition concerns them not. And thus it is of all other species of things which have no other essences but those ideas which are in the minds of men.

9. *Nor will it be less true or certain because moral ideas are of our own making and naming.*—But it will here be said, that if moral knowledge be placed in the contemplation of our own moral ideas, and those, as other modes, be of our own making, what strange notions will there be of justice and temperance! What confusion of virtues and vices, if everyone may make what ideas of them he pleases! No confusion nor disorder in the things themselves, nor the reasonings about them; no more than (in mathematics) there would be a disturbance in the demonstration, or a change in the properties of figures and their relations one to another, if a man should make a triangle with four corners, or a *trapezium* with four right angles: that is, in plain English, change the names of the figures, and call that by one name which mathematicians called ordinarily by another. For let a man make to himself the idea of a figure with three angles, whereof one is a right one, and call it, if he please, equilaterum or trapezium, or anything else, the properties of and demonstrations about that idea will be the same as if he called it a rectangular triangle. I confess, the change of the name by the impropriety of speech will at first disturb him who knows not what idea it stands for; but as soon as the figure is drawn, the consequences and demonstrations are plain and clear. Just the same is it in moral knowledge: let a man have the idea of taking from others, without their consent, what their honest industry has possessed them of, and call this

justice, if he please. He that takes the name here without the idea put to it, will be mistaken by joining another idea of his own to that name; but strip the idea of that name, or take it such as it is in the speaker's mind, and the same things will agree to it as if you called it injustice. Indeed, wrong names in moral discourses breed usually more disorder, because they are not so easily rectified as in mathematics, where the figure once drawn and seen makes the name useless and of no force. For what need of a sign when the thing signified is present and in view? But in moral names that cannot be so easily and shortly done, because of the many decompositions that go to the making up the complex ideas of those modes. But yet, for all this, the miscalling of any of those ideas contrary to the usual signification of the words of that language, hinders not but that we may have certain and demonstrative knowledge of their several agreements and disagreements, if we will carefully, as in mathematics, keep to the same precise ideas, and trace them in their several relations one to another without being led away by their names. If we but separate the idea under consideration from the sign that stands for it, our knowledge goes equally on in the discovery of real truth and certainty, whatever sounds we make use of.

10. *Misnaming disturbs not the certainty of the knowledge.*—One thing more we are to take notice of, that where God, or any other law-maker, hath defined any moral names, there they have made the essence of that species to which that name belongs; and there it is not safe to apply or use them otherwise: but in other cases it is bare impropriety of speech to apply them contrary to the common usage of the country. But yet even this too disturbs not the certainty of that knowledge, which is still to be had by a due contemplation and comparing of those even nick-named ideas.

11. (iii) *Ideas of substances have their archetypes without us.*—Thirdly, there is another sort of complex ideas, which being referred to archetypes without us may differ from them, and so our knowledge about them may come short of being

real. Such are our ideas of substances, which consisting of a collection of simple ideas, supposed taken from the works of nature, may yet vary from them, by having more or different ideas united in them than are to be found united in the things themselves: from whence it comes to pass that they may and often do fail of being exactly conformable to things themselves.

12. *So far as they agree with those, so far our knowledge concerning them is real.*—I say, then, that to have ideas of substances which, by being conformable to things, may afford us real knowledge, it is not enough, as in modes, to put together such ideas as have no inconsistence, though they did never before so exist; v. g., the ideas of sacrilege or perjury, etc., were as real and true ideas before as after the existence of any such fact. But our ideas of substances, being supposed copies, and referred to archetypes without us, must still be taken from something that does or has existed; they must not consist of ideas put together at the pleasure of our thoughts without any real pattern they were taken from, though we can perceive no inconsistence in such a combination. The reason whereof is, because we knowing not what real constitution it is of substances whereon our simple ideas depend, and which really is the cause of the strict union of some of them one with another, and the exclusion of others; there are very few of them that we can be sure are or are not inconsistent in nature, any farther than experience and sensible observation reach. Herein, therefore, is founded the reality of our knowledge concerning substances, that all our complex ideas of them must be such, and such only, as are made up of such simple ones as have been discovered to coexist in nature. And our ideas, being thus true, though not perhaps very exact copies, are yet the subjects of real (as far as we have any) knowledge of them: which, as has been already showed, will not be found to reach very far; but so far as it does, it will still be real knowledge. Whatever ideas we have, the agreement we find they have with others will still be knowledge. If those ideas be abstract, it will be

general knowledge. But to make it real concerning substances, the ideas must be taken from the real existence of things. Whatever simple ideas have been found to coexist in any substance, these we may with confidence join together again, and so make abstract ideas of substances. For whatever have once had an union in nature, may be united again.

13. *In our inquiries about substances we must consider ideas, and not confine our thoughts to names or species supposed set out by names.*—This if we rightly consider, and confine not our thoughts and abstract ideas to names, as if there were or could be no other sorts of things than what known names had already determined, and, as it were set out, we should think of things with greater freedom and less confusion than perhaps we do. It would possibly be thought a bold paradox, if not a very dangerous falsehood, if I should say, that some changelings who have lived forty years together without any appearance of reason, are something between a man and a beast: which prejudice is founded upon nothing else but a false supposition, that these two names, man and beast, stand for distinct species so set out by real essences that there can come no other species between them: whereas if we will abstract from those names, and the supposition of such specific essences made by nature, wherein all things of the same denominations did exactly and equally partake; if we would not fancy that there were a certain number of these essences wherein all things, as in moulds, were cast and formed; we should find that the idea of the shape, motion, and life of a man without reason is as much a distinct idea, and makes as much a distinct sort of things from man and beast, as the idea of the shape of an ass with reason would be different from either that of man or beast and be a species of an animal between or distinct from both. . . .

18. *Recapitulation.*—Wherever we perceive the agreement or disagreement of any of our ideas, there is certain knowledge; and wherever we are sure those ideas agree with the reality of things, there is certain real knowledge. Of which agreement of our ideas with the reality of things having here

given the marks, I think I have shown wherein it is that certainty, real certainty, consists. Which, whatever it was to others, was, I confess, to me heretofore one of those *desiderata* which I found great want of.

## CHAPTER V

## OF TRUTH IN GENERAL

1. *What Truth is.*—What is truth? was an inquiry many ages since; and it being that which all mankind either do, or pretend to search after, it cannot but be worth our while carefully to examine wherein it consists, and so acquaint ourselves with the nature of it as to observe how the mind distinguishes it from falsehood.

2. *A right joining or separating of signs,* i. e., *ideas or words.*—Truth, then, seems to me, in the proper import of the word, to signify nothing but the joining or separating of signs, as the things signified by them do agree or disagree one with another. The joining or separating of signs here meant, is what by another name we call proposition. So that truth properly belongs only to propositions: whereof there are two sorts, viz., mental and verbal; as there are two sorts of signs commonly made use of, viz. ideas and words,

3. *Which make mental or verbal propositions.*—To form a clear notion of truth, it is very necessary to consider truth of thought, and truth of words, distinctly one from another; but yet it is very difficult to treat of them asunder. Because it is unavoidable, in treating of mental propositions, to make use of words; and then the instances given of mental propositions cease immediately to be barely mental, and become verbal. For a mental proposition being nothing but a bare consideration of the ideas, as they are in our minds, stripped of names, they lose the nature of purely mental propositions as soon as they are put into words.

4. *Mental propositions are very hard to be treated of.*— And that which makes it yet harder to treat of mental and verbal propositions separately is, that most men, if not all, in their thinking and reasonings within themselves, make use of words instead of ideas: at least when the subject of their meditation contains in it complex ideas. Which is a great evidence of the imperfection and uncertainty of our ideas of that kind, and may, if attentively made use of, serve for a mark to show us what are those things we have clear and perfect established ideas of, and what not. For if we will curiously observe the way our mind takes in thinking and reasoning, we shall find, I suppose, that when we make any propositions within our own thoughts about white or black, sweet or bitter, a triangle or a circle, we can and often do frame in our minds the ideas themselves, without reflecting on the names. But when we would consider, or make propositions about the more complex ideas, as of a man, vitriol, fortitude, glory, we usually put the name for the idea; because the ideas these names stand for, being for the most part imperfect, confused, and undetermined, we reflect on the names themselves, because they are more clear, certain, and distinct, and readier occur to our thoughts than the pure ideas: and so we make use of these words instead of the ideas themselves, even when we would meditate and reason within ourselves, and make tacit mental propositions. In substances, as has been already noticed, this is occasioned by the imperfection of our ideas; we making the name stand for the real essence, of which we have no idea at all. In modes, it is occasioned by the great number of simple ideas that go to the making them up. For many of them being compounded, the name occurs much easier than the complex idea itself, which requires time and attention to be recollected, and exactly represented to the mind, even in those men who have formerly been at the pains to do it; and is utterly impossible to be done by those who, though they have ready in their memory the greatest part of the common words of that language, yet perhaps never troubled themselves in all their

lives to consider what precise ideas the most of them stood for. Some confused or obscure notions have served their turns, and many who talk very much of religion and conscience, of church and faith, of power and right, of obstructions and humors, melancholy and choler, would perhaps have little left in their thoughts and meditations, if one should desire them to think only of the things themselves, and lay by those words with which they so often confound others, and not seldom themselves also.

5. *Being nothing but the joining or separating ideas without words.*—But to return to the consideration of truth: we must, I say, observe two sorts of propositions that we are capable of making.

First, mental, wherein the ideas in our understandings are without the use of words put together, or separated by the mind, perceiving or judging of their agreement or disagreement.

Secondly, verbal propositions, which are words, the signs of our ideas, put together or separated in affirmative or negative sentences. By which way of affirming or denying, these signs, made by sounds, are, as it were, put together or separated one from another. So that proposition consists in joining or separating signs, and truth consists in the putting together or separating those signs, according as the things which they stand for agree or disagree.

6. *When mental propositions contain real truth, and when verbal.*—Everyone's experience will satisfy him that the mind, either by perceiving or supposing the agreement or disagreement of any of its ideas, does tacitly within itself put them into a kind of proposition affirmative or negative, which I have endeavored to express by the terms putting together and separating. But this action of the mind, which is so familiar to every thinking and reasoning man, is easier to be conceived by reflecting on what passes in us when we affirm or deny, than to be explained by words. When a man has in his head the idea of two lines, viz., the side and diagonal of a square whereof the diagonal is an inch long, he may

have the idea also of the division of that line into a certain number of equal parts; v. g., into five, ten, a hundred, a thousand, or any other number, and may have the idea of that inch line being divisible, or not divisible, into such equal parts, as a certain number of them will be equal to the side-line. Now, whenever he perceives, believes, or supposes such a kind of divisibility to agree or disagree to his idea of that line, he, as it were, joins or separates those two ideas, viz., the idea of that line and the idea of that kind of divisibility; and so makes a mental proposition, which is true or false, according as such a kind of divisibility, a divisibility into such aliquot parts, does really agree to that line or no. When ideas are so put together or separated in the mind as they or the things they stand for do agree or not, that is, as I may call it, mental truth. But truth of words is something more; and that is the affirming or denying of words one of another, as the ideas they stand for agree or disagree; and this again is two-fold: either purely verbal and trifling, which I shall speak of (Chap. viii), or real and instructive, which is the object of that real knowledge which we have spoken of already.

7. *Objection against verbal truth, that thus it may all be chimerical.*—But here again will be apt to occur the same doubt about truth, that did about knowledge: and it will be objected, that if truth be nothing but the joining and separating of words in propositions, as the ideas they stand for agree or disagree in men's minds, the knowledge of truth is not so valuable a thing as it is taken to be, nor worth the pains and time men employ in the search of it; since by this account it amounts to no more than the conformity of words to the chimeras of men's brains. Who knows not what odd notions many men's heads are filled with, and what strange ideas all men's brains are capable of? But if we rest here, we know the truth of nothing by this rule, but of the visionary words in our own imaginations; nor have other truth, but what as much concerns harpies and centaurs, as men and horses. For those, and the like, may be ideas in our heads,

and have their agreement or disagreement there, as well as the ideas of real beings, and so have as true propositions made about them. And it will be altogether as true a proposition to say all centaurs are animals, as that all men are animals; and the certainty of one as great as the other. For in both the propositions, the words are put together according to the agreement of the ideas in our minds, and the agreement of the idea of animal with that of centaur is as clear and visible to the mind as the agreement of the idea of animal with that of man; and so these two propositions are equally true, equally certain. But of what use is all such truth to us?

8. *Answered, real truth is about ideas agreeing to things.*—Though what has been said in the foregoing chapter to distinguish real from imaginary knowledge might suffice here, in answer to this doubt, to distinguish real truth from chimerical, or (if you please) barely nominal, they depending both on the same foundation; yet it may not be amiss here again to consider that though our words signify nothing but our ideas, yet being designed by them to signify things, the truth they contain when put into propositions will be only verbal, when they stand for ideas in the mind that have not an agreement with the reality of things. And therefore truth as well as knowledge may well come under the distinction of verbal and real; that being only verbal truth wherein terms are joined according to the agreement or disagreement of the ideas they stand for, without regarding whether our ideas are such as really have, or are capable of having, an existence in nature. But then it is they contain real truth when these signs are joined as our ideas agree, and when our ideas are such as we know are capable of having an existence in nature; which in substances we cannot know but by knowing that such have existed.

9. *Falsehood is the joining of names otherwise than their ideas agree.*—Truth is the marking down in words the agreement or disagreement of ideas as it is. Falsehood is the marking down in words the agreement or disagreement of ideas otherwise than it is. And so far as these ideas, thus

marked by sounds, agree to their archetypes, so far only is the truth real. The knowledge of this truth consists in knowing what ideas the words stand for, and the perception of the agreement or disagreement of those ideas, according as it is marked by those words.

10. *General propositions to be treated of more at large.*—But because words are looked on as the great conduits of truth and knowledge, and that in conveying and receiving of truth, and commonly in reasoning about it, we make use of words and propositions; I shall more at large inquire wherein the certainty of real truths contained in propositions consists, and where it is to be had; and endeavor to show in what sort of universal propositions we are capable of being certain of their real truth or falsehood.

I shall begin with general propositions, as those which most employ our thoughts, and exercise our contemplation. General truths are most looked after by the mind as those that most enlarge our knowledge; and by their comprehensiveness satisfying us at once of many particulars, enlarge our view, and shorten our way to knowledge.

11. *Moral and metaphysical truth.*—Besides truth taken in the strict sense before mentioned, there are other sorts of truths: as, (i) Moral truth, which is speaking of things according to the persuasion of our own minds, though the proposition we speak agree not to the reality of things. (ii) Metaphysical truth, which is nothing but the real existence of things, conformable to the ideas to which we have annexed their names. This, though it seems to consist in the very beings of things, yet, when considered a little nearly, will appear to include a tacit proposition, whereby the mind joins that particular thing to the idea it had before settled with the name to it. But these considerations of truth, either having before taken notice of, or not being much to our present purpose, it may suffice here only to have mentioned them.

## CHAPTER VI

## OF UNIVERSAL PROPOSITIONS, THEIR TRUTH AND CERTAINTY

1. *Treating of words necessary to knowledge.*—Though the examining and judging of ideas by themselves, their names being quite laid aside, be the best and surest way to clear and distinct knowledge; yet, through the prevailing custom of using sounds for ideas, I think it is very seldom practised. Everyone may observe how common it is for names to be made use of, instead of the ideas themselves, even when men think and reason within their own breasts; especially if the ideas be very complex, and made up of a great collection of simple ones. This makes the consideration of words and propositions so necessary a part of the treatise of knowledge, that it is very hard to speak intelligibly of the one, without explaining the other.

2. *General truths hardly to be understood but in verbal propositions.*—All the knowledge we have, being only of particular or general truths, it is evident that whatever may be done in the former of these, the latter, which is that which with reason is most sought after, can never be well made known, and is very seldom apprehended, but as conceived and expressed in words. It is not, therefore, out of our way in the examination of our knowledge, to inquire into the truth and certainty of universal propositions.

3. *Certainty twofold—of truth and of knowledge.*—But that we may not be misled in this case by that which is the danger everywhere, I mean by the doubtfulness of terms, it is fit to observe that certainty is twofold: certainty of truth and certainty of knowledge. Certainty of truth is when words are so put together in propositions as exactly to express the agreement or disagreement of the ideas they stand for, as really it is. Certainty of knowledge is to perceive the agreement or disagreement of ideas, as expressed in any proposi-

tion. This we usually call knowing, or being certain of the truth of any proposition.

4. *No proposition can be known to be true where the essence of each species mentioned is not known.*—Now, because we cannot be certain of the truth of any general proposition unless we know the precise bounds and extent of the species its terms stand for, it is necessary we should know the essence of each species, which is that which constitutes and bounds it. This, in all simple ideas and modes, is not hard to do. For in these the real and nominal essence being the same, or, which is all one, the abstract idea which the general term stands for being the sole essence and boundary that is or can be supposed of the species, there can be no doubt how far the species extends, or what things are comprehended under each term; which, it is evident, are all that have an exact conformity with the idea it stands for, and no other. But in substances wherein a real essence distinct from the nominal is supposed to constitute, determine, and bound the species, the extent of the general word is very uncertain; because, not knowing this real essence, we cannot know what is, or what is not of that species; and, consequently, what may or may not with certainty be affirmed of it. And thus, speaking of a man, or gold, or any other species of natural substances, as supposed constituted by a precise and real essence which nature regularly imparts to every individual of that kind, whereby it is made to be of that species, we cannot be certain of the truth of any affirmation or negation made of it. For man or gold, taken in this sense, and used for species of things constituted by real essences, different from the complex idea in the mind of the speaker, stand for we know not what; and the extent of these species, with such boundaries, are so unknown and undetermined, that it is impossible with any certainty to affirm that all men are rational, or that all gold is yellow. But where the nominal essence is kept to, as the boundary of each species, and men extend the application of any general term no further than to the particular things in which the complex idea it stands for is to be

found, there they are in no danger to mistake the bounds of each species, nor can be in doubt, on this account, whether any proposition be true or not. I have chosen to explain this uncertainty of propositions in this scholastic way, and have made use of the terms of essences, and species, on purpose to show the absurdity and inconvenience there is to think of them as of any other sort of realities, than barely abstract ideas with names to them. To suppose that the species of things are anything but the sorting of them under general names, according as they agree to several abstract ideas, of which we make those names the signs, is to confound truth, and introduce uncertainty into all general propositions that can be made about them. Though therefore these things might, to people not possessed with scholastic learning, be treated of in a better and clearer way; yet those wrong notions of essences or species having got root in most people's minds who have received any tincture from the learning which has prevailed in this part of the world, are to be discovered and removed, to make way for that use of words which should convey certainty with it.

5. *This more particularly concerns substances.*—The names of substances, then, whenever made to stand for species which are supposed to be constituted by real essences which we know not, are not capable to convey certainty to the understanding: of the truth of general propositions made up of such terms we cannot be sure. [The reason whereof is plain: for how can we be sure that this or that quality is in gold, when we know not what is or is not gold? Since in this way of speaking, nothing is gold but what partakes of an essence, which we not knowing cannot know where it is or is not, and so cannot be sure that any parcel of matter in the world is or is not in this sense gold; being incurably ignorant whether it has or has not that which makes anything to be called gold; i. e., that real essence of gold whereof we have no idea at all: this being as impossible for us to know as it is for a blind man to tell in what flower the color of a pansy is or is not to be found, whilst he has no idea of the color of a

pansy at all. Or if we could (which is impossible) certainly know where a real essence, which we know not, is—v. g., in what parcels of matter the real essence of gold is—yet could we not be sure that this or that quality could with truth be affirmed of gold; since it is impossible for us to know that this or that quality or idea has a necessary connection with a real essence of which we have no idea at all, whatever species that supposed real essence may be imagined to constitute.]

6. *The truth of few universal propositions concerning substances is to be known.*—On the other side, the names of substances, when made use of as they should be, for the ideas men have in their minds, though they carry a clear and determinate signification with them, will not yet serve us to make many universal propositions, of whose truth we can be certain. Not because in this use of them we are uncertain what things are signified by them, but because the complex ideas they stand for are such combinations of simple ones as carry not with them any discoverable connection or repugnancy, but with a very few other ideas.

7. *Because coexistence of ideas in few cases is to be known.*—The complex ideas that our names of the species of substances properly stand for, are collections of such qualities as have been observed to coexist in an unknown substratum, which we call substance: but what other qualities necessarily coexist with such combinations, we cannot certainly know, unless we can discover their natural dependence; which, in their primary qualities, we can go but a very little way in; and in all their secondary qualities we can discover no connection at all, for the reasons mentioned, Chap. iii., viz.: (1) Because we know not the real constitutions of substances, on which each secondary quality particularly depends. (2) Did we know that, it would serve us only for experimental (not universal) knowledge, and reach with certainty no further than that bare instance; because our understandings can discover no conceivable connection between any secondary quality and any modification whatsoever of any of the primary ones. And therefore there are very few general propositions to be made

concerning substances which can carry with them undoubted certainty.

8. *Instance in gold.*—All gold is fixed, is a proposition whose truth we cannot be certain of, how universally soever it be believed. For if, according to the useless imagination of the schools, anyone supposes the term gold to stand for a species of things set out by nature, by a real essence belonging to it, it is evident he knows not what particular substances are of that species, and so cannot with certainty affirm anything universally of gold. But if he makes gold stand for a species determined by its nominal essence, let the nominal essence, for example, be the complex idea of a body of a certain yellow color, malleable, fusible, and heavier than any other known; in this proper use of the word gold, there is no difficulty to know what is or is not gold. But yet no other quality can with certainty be universally affirmed or denied of gold, but what hath a discoverable connection or inconsistency with that nominal essence. Fixedness, for example, having no necessary connection that we can discover with the color, weight, or any other simple idea of our complex one, or with the whole combination together; it is impossible that we should certainly know the truth of this proposition, that all gold is fixed.

9. As there is no discoverable connection between fixedness and the color, weight, and other simple ideas of that nominal essence of gold; so if we make our complex idea of gold a body yellow, fusible, ductile, weighty, and fixed, we shall be at the same uncertainty concerning solubility in *aqua regia,* and for the same reason: since we can never, from consideration of the ideas themselves, with certainty affirm or deny of a body whose complex idea is made up of yellow, very weighty, ductile, fusible, and fixed, that it is soluble in *aqua regia;* and so on of the rest of its qualities. I would gladly meet with one general affirmation concerning any quality of gold that anyone can certainly know is true. It will, no doubt, be presently objected, Is not this an universal proposition, "All gold is malleable?" To which I answer, it is a

very certain proposition, if malleableness be a part of the complex idea the word gold stands for. But then here is nothing affirmed of gold but that that sound stands for an idea in which malleableness is contained; and such a sort of truth and certainty as this it is to say a centaur is four-footed. But if malleableness make not a part of the specific essence the name of gold stands for, it is plain, "All gold is malleable," is not a certain proposition. Because, let the complex idea of gold be made up of whichsoever of its other qualities you please, malleableness will not appear to depend on that complex idea, nor follow from any simple one contained in it: the connection that malleableness has (if it has any) with those other qualities being only by the intervention of the real constitution of its insensible parts; which, since we know not, it is impossible we should perceive that connection, unless we could discover that which ties them together.

10. *As far as any such coexistence can be known, so far universal propositions may be certain. But this will go but a little way.* The more, indeed, of these coexisting qualities we unite into one complex idea under one name, the more precise and determinate we make the signification of that word; but never yet make it thereby more capable of universal certainty, in respect of other qualities not contained in our complex idea; since we perceive not their connection or dependence on one another, being ignorant both of that real constitution in which they are all founded, and also how they flow from it. For the chief part of our knowledge concerning substances is not, as in other things, barely of the relation of two ideas that may exist separately; but is of the necessary connection and coexistence of several distinct ideas in the same subject, or of their repugnancy so to coexist. Could we begin at the other end, and discover what it was wherein that color consisted, what made a body lighter or heavier, what texture of parts made it malleable, fusible, and fixed, and fit to be dissolved in this sort of liquor, and not in another—if, I say, we had such an idea as this of bodies, and could perceive wherein all sensible qualities originally consist, and how they

are produced; we might frame such ideas of them as would furnish us with matter of more general knowledge, and enable us to make universal propositions, that should carry general truth and certainty with them. But whilst our complex ideas of the sorts of substances are so remote from that internal real constitution on which their sensible qualities depend, and are made up of nothing but an imperfect collection of those apparent qualities our senses can discover, there can be few general propositions concerning substances of whose real truth we can be certainly assured; since there are but few simple ideas of whose connection and necessary coexistence we can have certain and undoubted knowledge. I imagine, amongst all the secondary qualities of substances, and the powers relating to them, there cannot any two be named whose necessary coexistence or repugnance to coexist, can certainly be known, unless in those of the same sense, which necessarily exclude one another, as I have elsewhere showed. No one, I think, by the color that is in any body, can certainly know what smell, taste, sound, or tangible qualities it has, nor what alterations it is capable to make or receive on or from other bodies. The same may be said of the sound or taste, etc. Our specific names of substances standing for any collections of such ideas, it is not to be wondered that we can with them make very few general propositions of undoubted real certainty. But yet so far as any complex idea of any sort of substances contains in it any simple idea whose necessary coexistence with any other may be discovered, so far universal propositions may with certainty be made concerning it: v. g., could anyone discover a necessary connection between malleableness and the color or weight of gold, or any other part of the complex idea signified by that name, he might make a certain universal proposition concerning gold in this respect; and the real truth of this proposition, that "All gold is malleable," would be as certain as of this, "The three angles of all right-lined triangles are all equal to two right ones."

11. The *qualities which make our complex ideas of substances depend mostly on external, remote, and unperceived*

*causes.*—Had we such ideas of substances as to know what real constitutions produce those sensible qualities we find in them, and how those qualities flowed from thence, we could, by the specific ideas of their real essences in our own minds, more certainly find out their properties, and discover what qualities they had or had not, than we can now by our senses: and to know the properties of gold, it would be no more necessary that gold should exist, and that we should make experiments upon it, than it is necessary for the knowing the properties of a triangle, that a triangle should exist in any matter, the idea in our minds would serve for the one as well as the other. But we are so far from being admitted into the secrets of nature, that we scarce so much as ever approach the first entrance towards them. For we are wont to consider the substances we meet with, each of them as an entire thing by itself, having all its qualities in itself, and independent of other things; overlooking, for the most part, the operations of those invisible fluids they are encompassed with, and upon whose motions and operations depend the greatest part of those qualities which are taken notice of in them, and are made by us the inherent marks of distinction whereby we know and denominate them. Put a piece of gold anywhere by itself, separate from the reach and influence of all other bodies, it will immediately lose all its color and weight, and perhaps malleableness too; which, for aught I know, would be changed into a perfect friability. Water, in which to us fluidity is an essential quality, left to itself, would cease to be fluid. But if inanimate bodies owe so much of their present state to other bodies without them, that they would not be what they appear to us were those bodies that environ them removed; it is yet more so in vegetables, which are nourished, grow, and produce leaves, flowers, and seeds, in a constant succession. And if we look a little nearer into the state of animals, we shall find that their dependence, as to life, motion, and the most considerable qualities to be observed in them, is so wholly on extrinsical causes and qualities of other bodies, that make no part of them, that they cannot subsist a moment without them:

though yet those bodies on which they depend are little taken notice of, and make no part of the complex ideas we frame of those animals. Take the air but for a minute from the greatest part of living creatures, and they presently lose sense, life, and motion. This the necessity of breathing has forced into our knowledge. But how many other extrinsical and possibly very remote bodies do the springs of these admirable machines depend on, which are not vulgarly observed, or so much as thought on; and how many are there which the severest inquiry can never discover? The inhabitants of this spot of the universe, though removed so many millions of miles from the sun, yet depend so much on the duly tempered motion of particles coming from or agitated by it, that were this earth removed but a small part of the distance out of its present situation, and placed a little further or nearer that source of heat, it is more than probable that the greatest part of the animals in it would immediately perish: since we find them so often destroyed by an excess or defect of the sun's warmth, which an accidental position in some parts of this our little globe exposes them to. The qualities observed in a loadstone must needs have their source far beyond the confines of that body; and the ravage made often on several sorts of animals by invisible causes, the certain death (as we are told) of some of them, by barely passing the line, or, as it is certain of other, by being removed into a neighboring country; evidently show that the concurrence and operations of several bodies, with which they are seldom thought to have anything to do, is absolutely necessary to make them be what they appear to us, and to preserve those qualities by which we know and distinguish them. We are then quite out of the way when we think that things contain within themselves the qualities that appear to us in them; and we in vain search for that constitution within the body of a fly or an elephant upon which depend those qualities and powers we observe in them. For which perhaps, to understand them aright, we ought to look not only beyond this our earth and atmosphere, but even beyond the sun or remotest star our eyes have yet discovered.

For how much the being and operation of particular substances in this our globe depends on causes utterly beyond our view, is impossible for us to determine. We see and perceive some of the motions and grosser operations of things here about us; but whence the streams come that keep all these curious machines in motion and repair, how conveyed and modified, is beyond our notice and apprehension: and the great parts and wheels, as I may so say, of this stupendous structure of the universe, may, for aught we know, have such a connection and dependence in their influences and operations one upon another, that perhaps things in this our mansion would put on quite another face, and cease to be what they are, if some one of the stars or great bodies incomprehensibly remote from us, should cease to be or move as it does. This is certain: things, however absolute and entire they seem in themselves, are but retainers to other parts of nature, for that which they are most taken notice of by us. Their observable qualities, actions, and powers are owing to something without them; and there is not so complete and perfect a part that we know of nature, which does not owe the being it has, and the excellences of it, to its neighbors; and we must not confine our thoughts within the surface of any body, but look a great deal further, to comprehend perfectly those qualities that are in it.

12. If this be so, it is not to be wondered that we have very imperfect ideas of substances, and that the real essences, on which depend their properties and operations, are unknown to us. We cannot discover so much as that size, figure, and texture of their minute and active parts, which is really in them; much less the different motions and impulses made in and upon them by bodies from without, upon which depends, and by which is formed the greatest and most remarkable part of those qualities we observe in them, and of which our complex ideas of them are made up. This consideration alone is enough to put an end to all our hopes of ever having the ideas of their real essences; which whilst we want, the nominal essences we make use of instead of them, will be able to

furnish us but very sparingly with any general knowledge or universal propositions capable of real certainty.

13. *Judgment may reach farther, but that is not knowledge.* —We are not therefore to wonder, if certainty be to be found in very few general propositions made concerning substances: our knowledge of their qualities and properties goes very seldom farther than our senses reach and inform us. Possibly inquisitive and observing men may, by strength of judgment, penetrate farther, and, on probabilities taken from wary observation, and hints well laid together, often guess right at what experience has not yet discovered to them. But this is but guessing still; it amounts only to opinion, and has not that certainty which is requisite to knowledge. For all general knowledge lies only in our own thoughts, and consists barely in the contemplation of our own abstract ideas. Wherever we perceive any agreement or disagreement amongst them, there we have general knowledge; and by putting the names of those ideas together accordingly in propositions, can with certainty pronounce general truths. But because the abstract ideas of substances, for which their specific names stand, whenever they have any distinct and determinate signification, have a discoverable connection or inconsistency with but a very few other ideas, the certainty of universal propositions concerning substances is very narrow and scanty in that part, which is our principal inquiry concerning them; and there are scarce any of the names of substances, let the idea it is applied to be what it will, of which we can generally and with certainty pronounce that it has or has not this or that other quality belonging to it, and constantly coexisting or inconsistent with that idea, wherever it is to be found.

14. *What is requisite for our knowledge of substances.*— Before we can have any tolerable knowledge of this kind, we must first know what changes the primary qualities of one body do regularly produce in the primary qualities of another, and how. Secondly, we must know what primary qualities of any body produce certain sensations or ideas in us. This is in truth no less than to know all the effects of

matter, under its divers modifications of bulk, figure, cohesion of parts, motion and rest; which, I think everybody will allow, is utterly impossible to be known by us without revelation. Nor if it were revealed to us what sort of figure, bulk, and motion of corpuscles would produce in us the sensation of a yellow color, and what sort of figure, bulk, and texture of parts in the superficies of any body were fit to give such corpuscles their due motion to produce that color; would that be enough to make universal propositions with certainty, concerning the several sorts of them, unless we had faculties acute enough to perceive the precise bulk, figure texture, and motion of bodies in those minute parts, by which they operate on our senses, so that we might by those frame our abstract ideas of them. I have mentioned here only corporeal substances, whose operations seem to lie more level to our understandings: for as to the operations of spirits, both their thinking and moving of bodies, we at first sight find ourselves at a loss; though perhaps, when we have applied our thoughts a little nearer to the consideration of bodies and their operations, and examined how far our notions, even in these, reach with any clearness beyond sensible matter of fact, we shall be bound to confess that, even in these too, our discoveries amount to very little beyond perfect ignorance and incapacity.

15. *Whilst our ideas of substances contain not their real constitutions, we can make but few general certain propositions concerning them.*—This is evident, the abstract complex ideas of substances, for which their general names stand, not comprehending their real constitutions, can afford us very little universal certainty. Because our ideas of them are not made up of that on which those qualities we observe in them, and would inform ourselves about, do depend, or with which they have any certain connection: v. g., let the ideas to which we give the name man be, as it commonly is, a body of the ordinary shape, with sense, voluntary motion, and reason joined to it. This being the abstract idea, and consequently the essence of our species, man, we can make but very few general certain propositions concerning man, standing for

such an idea. Because not knowing the real constitution on which sensation, power of motion, and reasoning, with that peculiar shape, depend, and whereby they are united together in the same subject, there are very few other qualities with which we can perceive them to have a necessary connection: and therefore we cannot with certainty affirm that all men sleep by intervals, that no man can be nourished by wood or stones, that all men will be poisoned by hemlock, because these ideas have no connection nor repugnancy with this our nominal essence of man, with this abstract idea that name stands for; we must, in these and the like, appeal to trial in particular subjects, which can reach but a little way. We must content ourselves with probability in the rest; but can have no general certainty, whilst our specific idea of man contains not that real constitution which is the root wherein all his inseparable qualities are united, and from whence they flow. Whilst our idea the word man stands for is only an imperfect collection of some sensible qualities and powers in him, there is no discernible connection or repugnance between our specific idea, and the operation of either the parts of hemlock or stones upon his constitution. There are animals that safely eat hemlock, and others that are nourished by wood and stones; but as long as we want ideas of those real constitutions of different sorts of animals whereon these and the like qualities and powers depend, we must not hope to reach certainty in universal propositions concerning them. Those few ideas only which have a discernible connection with our nominal essence, or any part of it, can afford us such propositions. But these are so few, and of so little moment, that we may justly look on our certain general knowledge of substances as almost none at all.

16. *Wherein lies the general certainty of propositions.*—To conclude: general propositions, of what kind soever, are then only capable of certainty, when the terms used in them stand for such ideas whose agreement or disagreement, as there expressed, is capable to be discovered by us. And we are then certain of their truth or falsehood, when we perceive the

ideas the terms stand for to agree or not agree according as they are affirmed or denied one of another. Whence we may take notice that general certainty is never to be found but in our ideas. Whenever we go to seek it elsewhere, in experiment or observations without us, our knowledge goes not beyond particulars. It is the contemplation of our own abstract ideas that alone is able to afford us general knowledge. . . .

[Chapters VII, "Of Maxims," and VIII, "Of Trifling Propositions," are closely connected with the attack on innate principles in Book I. Maxims, or axioms, "are a sort of propositions," which "have passed for principles of science." Because they are self-evident they have been supposed innate and the foundation of all our other knowledge. Locke proposes, in this chapter, "to enquire into the reason of their evidence, and see whether it be peculiar to them alone, and also examine how far they influence and govern our other knowledge." Since knowledge, for Locke, consists in a perception of the agreement or disagreement of ideas, "where that agreement or disagreement is perceived immediately by itself, without the intervention or help of any other, there our knowledge is self-evident." Self-evidence, therefore, is not peculiar to received axioms.

In respect to the four sorts of agreement and disagreement, Locke shows that as to *identity and diversity,* all propositions are equally self-evident; that in respect to *coexistence,* "or such necessary connection between two ideas, that in the subject where one of them is supposed, there the other must necessarily be also," we have few self-evident propositions; that in the case of *relations of modes* we have many such propositions, as e. g. in mathematics; and, finally, that concerning *real existence,* "since that has no connection with any other of our ideas but that of ourselves and of a First Being, we have in that concerning the real existence of all other beings not so much as demonstrative, much less a self-evident knowledge, and therefore concerning those there are no maxims."

Locke now considers the question how far these received maxims "influence and govern our other knowledge." He states the view he wishes to refute as follows: "The rules established in the Schools, that all reasonings are *ex præcognitis et præconcessis,* seem to lay the foundation of all other knowledge in these maxims, and to suppose them to be *præcognita;* whereby, I think, is meant these two things: first, that these axioms are those truths that are first known to the mind; and secondly, that upon them the other parts of our knowledge depend." Locke, as in Book I, again denies both of these assertions as contrary to his plain historical account of the original of our knowledge. Of what use, then, are these general maxims? They are of use, he answers, for systematic exposition, in the ordinary methods of teaching the sciences, though of little or no value in advancing them farther, and they are "of use in disputes, for the silencing of obstinate wranglers, and bringing those contests to some conclusion."

Trifling propositions "are universal propositions which, though they be certainly true, yet they add no light to our understandings, bring no increase to our knowledge." Such are all purely identical propositions, and propositions wherein "a part of the complex idea is predicated of the name of the whole; a part of the definition, of the word defined."

"We can know then the truth of two sorts of propositions with perfect certainty. The one is, of those trifling propositions which have a certainty in them, but it is but a verbal certainty, but not instructive. And secondly, we can know the truth, and so may be certain in propositions which affirm something of another, which is a necessary consequence of its precise complex idea, but not contained in it: as that 'the external angle of all triangles is bigger than either of the opposite internal angles'; which relation of the outward angle to either of the opposite internal angles, making no part of the complex idea signified by the name triangle, this is a real truth, and conveys with it instructive real knowledge."]

## CHAPTER IX

## OF OUR THREEFOLD KNOWLEDGE OF EXISTENCE

1. *General certain propositions concern not existence.*—Hitherto we have only considered the essences of things, which, being only abstract ideas, and thereby removed in our thoughts from particular existence, (that being the proper

operation of the mind in abstraction, to consider an idea under no other existence but what it has in the understanding), gives us no knowledge of real existence at all. Where by the way, we may take notice that universal propositions, of whose truth or falsehood we can have certain knowledge, concern not existence; and farther, that all particular affirmations or negations that would not be certain if they were made general, are only concerning existence; they declaring only the accidental union or separation of ideas in things existing, which in their abstract natures have no known necessary union or repugnancy.

2. *A threefold knowledge of existence.*—But leaving the nature of propositions, and different ways of predication, to be considered more at large in another place, let us proceed now to inquire concerning our knowledge of the existence of things, and how we come by it. I say then, that we have the knowledge of our own existence by intuition; of the existence of God by demonstration; and of other things by sensation.

3. *Our knowledge of our own existence is intuitive.*—As for our own existence, we perceive it so plainly and so certainly that it neither needs nor is capable of any proof. For nothing can be more evident to us than our own existence. I think, I reason, I feel pleasure and pain: can any of these be more evident to me than my own existence? If I doubt of all other things, that very doubt makes me perceive my own existence, and will not suffer me to doubt of that. For if I know I feel pain, it is evident I have as certain perception of my own existence as of the existence of the pain I feel; or if I know I doubt, I have as certain perception of the existence of the thing doubting, as of that thought which I call doubt. Experience, then, convinces us that we have an intuitive knowledge of our own existence, and an internal infallible perception that we are. In every act of sensation, reasoning, or thinking, we are conscious to ourselves of our own being, and in this matter come not short of the highest degree of certainty.

# CHAPTER X

## OF OUR KNOWLEDGE OF THE EXISTENCE OF A GOD

1. *We are capable of knowing certainly that there is a God.*—Though God has given us no innate ideas of Himself, though He has stamped no original characters on our minds wherein we may read His being; yet, having furnished us with those faculties our minds are endowed with, He hath not left Himself without witness; since we have sense, perception, and reason, and cannot want a clear proof of Him as long as we carry ourselves about us. Nor can we justly complain of our ignorance in this great point, since He has so plentifully provided us with the means to discover and know Him, so far as is necessary to the end of our being and the great concernment of our happiness. But though this be the most obvious truth that reason discovers, and though its evidence be (if I mistake not) equal to mathematical certainty; yet it requires thought and attention, and the mind must apply itself to a regular deduction of it from some part of our intuitive knowledge, or else we shall be as uncertain and ignorant of this as of other propositions which are in themselves capable of clear demonstration. To show, therefore, that we are capable of knowing, i. e. being certain, that there is a God, and how we may come by this certainty, I think we need go no farther than ourselves, and that undoubted knowledge we have of our own existence.

2. *Man knows that he himself is.*—I think it is beyond question that man has a clear idea of his own being: he knows certainly that he exists, and that he is something. He that can doubt whether he be anything or no, I speak not to; no more than I would argue with pure nothing, or endeavor to convince nonentity that it were something. If anyone pretends to be so skeptical as to deny his own existence (for really to doubt of it is manifestly impossible), let him, for me,

enjoy his beloved happiness of being nothing, until hunger or some other pain convince him of the contrary. This, then, I think I may take for a truth, which everyone's certain knowledge assures him of beyond the liberty of doubting, viz., that he is something that actually exists.

3. *He knows also that nothing cannot produce a being, therefore something eternal.*—In the next place, man knows by an intuitive certainty that bare nothing can no more produce any real being, than it can be equal to two right angles. If a man knows not that nonentity, or the absence of all being, cannot be equal to two right angles, it is impossible he should know any demonstration in Euclid. If therefore we know there is some real being, and that nonentity cannot produce any real being, it is an evident demonstration that from eternity there has been something; since what was not from eternity had a beginning, and what had a beginning must be produced by something else.

4. *That Eternal Being must be most powerful.*—Next, it is evident that what had its being and beginning from another, must also have all that which is in and belongs to its being from another too. All the powers it has, must be owing to and received from the same source. This eternal source, then, of all being must also be the source and original of all power; and so this Eternal Being must be also the most powerful.

5. *And most knowing.*—Again, a man finds in himself perception and knowledge. We have then got one step farther; and we are certain now that there is not only some being, but some knowing, intelligent being in the world. There was a time, then, when there was no knowing being, and when knowledge began to be; or else there has been also a knowing Being from eternity. If it be said, "There was a time when no being had any knowledge, when that Eternal Being was void of all understanding;" I reply that then it was impossible there should ever have been any knowledge; it being as impossible that things wholly void of knowledge, and operating blindly and without any perception, should produce a knowing being, as it is impossible that a triangle should

make itself three angles bigger than two right ones. For it is as repugnant to the idea of senseless matter that it should put into itself sense, perception, and knowledge, as it is repugnant to the idea of a triangle that it should put into itself greater angles than two right ones.

6. *And therefore God.*—Thus from the consideration of ourselves, and what we infallibly find in our own constitutions, our reason leads us to the knowledge of this certain and evident truth, that there is an eternal, most powerful, and most knowing Being; which whether anyone will please to call God, it matters not. The thing is evident; and from this idea duly considered, will easily be deduced all those other attributes which we ought to ascribe to this Eternal Being. [If, nevertheless, anyone should be found so senselessly arrogant as to suppose man alone knowing and wise, but yet the product of mere ignorance and chance, and that all the rest of the universe acted only by that blind haphazard; I shall leave with him that very rational and emphatical rebuke of Tully, Lib. ii. *De Leg.,* to be considered at his leisure: "What can be more sillily arrogant and misbecoming than for a man to think that he has a mind and understanding in him, but yet in all the universe beside there is no such thing? Or that those things which, with the utmost stretch of his reason, he can scarce comprehend, should be moved and managed without any reason at all?" *Quid est enim verius quam neminem esse oportere tam stulte arrogantem, ut in se mentem et rationem putet inesse, in cœlo mundoque non putet? Aut ea quæ vix summa ingenii ratione comprehendat, nulla ratione moveri putet?*]

From what has been said, it is plain to me we have a more certain knowledge of the existence of a God than of anything our senses have not immediately discovered to us. Nay, I presume I may say that we more certainly know that there is a God, than that there is anything else without us. When I say we *know,* I mean there is such a knowledge within our reach which we cannot miss, if we will but apply our minds to that as we do to several other inquiries.

7. *Our idea of a most perfect Being, not the sole proof of a God.*—How far the idea of a most perfect being which a man may frame in his mind, does or does not prove the existence of a God, I will not here examine. For in the different make of men's tempers, and application of their thoughts, some arguments prevail more on one, and some on another, for the confirmation of the same truth. But yet, I think this I may say that it is an ill way of establishing this truth and silencing atheists, to lay the whole stress of so important a point as this upon that sole foundation, and take some men's having that idea of God in their minds (for it is evident some men have none, and some worse than none, and the most very different) for the only proof of a Deity; and out of an overfondness of that darling invention, cashier or at least endeavor to invalidate, all other arguments, and forbid us to hearken to those proofs, as being weak or fallacious, which our own existence and the sensible parts of the universe offer so clearly and cogently to our thoughts, that I deem it impossible for a considering man to withstand them. For I judge it as certain and clear a truth as can any where be delivered, that "the invisible things of God are clearly seen from the creation of the world, being understood by the things that are made, even His eternal power and Godhead." Though our own being furnishes us, as I have shown, with an evident and incontestable proof of a Deity; and I believe nobody can avoid the cogency of it who will but as carefully attend to it as to any other demonstration of so many parts: yet this being so fundamental a truth, and of that consequence that all religion and genuine morality depend thereon, I doubt not but I shall be forgiven by my reader if I go over some parts of this argument again, and enlarge a little more upon them.

8. *Something from eternity.*—There is no truth more evident than that something must be from eternity. I never yet heard of any one so unreasonable, or that could suppose so manifest a contradiction, as a time wherein there was perfectly nothing; this being of all absurdities the greatest, to imagine that pure nothing, the perfect negation

and absence of all beings, should ever produce any real existence.

It being then unavoidable for all rational creatures to conclude that something has existed from eternity, let us next see what kind of thing that must be.

9. *Two sorts of beings cogitative and incogitative.*—There are but two sorts of beings in the world that man knows or conceives:—

First, such as are purely material, without sense, perception, or thought, as the clippings of our beards and parings of our nails.

Secondly, sensible, thinking, perceiving beings, such as we find ourselves to be; which, if you please, we will hereafter call *cogitative* and *incogitative* beings; which, to our present purpose, if for nothing else, are perhaps better terms than material and immaterial.

10. *Incogitative being cannot produce a cogitative.*—If then there must be something eternal, let us see what sort of being it must be. And to that it is very obvious to reason that it must necessarily be a cogitative being. For it is as impossible to conceive that ever bare incogitative matter should produce a thinking intelligent being, as that nothing should of itself produce matter. Let us suppose any parcel of matter eternal, great or small, we shall find it in itself able to produce nothing. For example, let us suppose the matter of the next pebble we meet with, eternal, closely united, and the parts firmly at rest together: if there were no other being in the world, must it not eternally remain so, a dead, inactive lump? Is it possible to conceive it can add motion to itself, being purely matter, or produce anything? Matter, then, by its own strength, cannot produce in itself so much as motion: the motion it has must also be from eternity, or else be produced and added to matter by some other being more powerful than matter; matter, as is evident, having not power to produce motion in itself. But let us suppose motion eternal too; yet matter, incogitative matter and motion, whatever changes it might produce of figure and bulk, could never

produce thought. Knowledge will still be as far beyond the power of motion and matter to produce, as matter is beyond the power of nothing or nonentity to produce. And I appeal to everyone's own thoughts, whether he cannot as easily conceive matter produced by nothing, as thought to be produced by pure matter, when before there was no such thing as thought or an intelligent being existing. Divide matter into as minute parts as you will, which we are apt to imagine a sort of spiritualizing or making a thinking thing of it; vary the figure and motion of it as much as you please; a globe, cube, cone, prism, cylinder, etc., whose diameters are but 100,000th part of a gry,[1] will operate no otherwise upon other bodies of proportionable bulk than those of an inch or foot diameter; and you may as rationally expect to produce sense, thought, and knowledge, by putting together in a certain figure and motion gross particles of matter, as by those that are the very minutest that do any where exist. They knock, impel, and resist one another just as the greater do, and that is all they can do. So that, if we will suppose nothing first or eternal, matter can never begin to be; if we will suppose bare matter without motion, eternal motion can never begin to be; if we suppose only matter and motion first, or eternal, thought can never begin to be. [For it is impossible to conceive that matter, either with or without motion could have originally in and from itself, sense, perception, and knowledge, as is evident from hence, that then sense, perception, and knowledge must be a property eternally inseparable from matter and every particle of it. Not to add that though our general or specific conception of matter makes us speak of it as one thing, yet really all matter is not one individual thing, neither is there any such thing existing as one material being, or one single body, that we know or can conceive. And therefore, if matter were the eternal first cogitative being, there would not be one eternal infinite cogitative being, but an infinite number of eternal finite cogitative beings independent one of another, of limited force and distinct thoughts, which could never produce that order, harmony, and beauty, which are to be found in nature. Since, therefore, whatsoever is the first eternal being must necessarily be cogitative; and] whatsoever is first of all things must necessarily contain in it, and actually have, at least, all the perfections that can ever after exist; nor can it ever give to another any perfection that it hath not, either actually in itself or at least in a higher degree; [it necessarily follows that the first eternal being cannot be matter.]

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[1] A gry is one-tenth of a line, a line one-tenth of an inch, an inch one-tenth of a philosophical foot, a philosophical foot one-third of a pendulum, whose diadroms, in the latitude of forty-five degrees, are each equal to one second of time, or one-sixtieth of a minute. I have affectedly made use of this measure here, and the parts of it, under a decimal division, with names to them; because I think it would be of general convenience that this should be the common measure in the commonwealth of letters.

11. *Therefore there has been an eternal wisdom.*—If, therefore, it be evident that something necessarily must exist from eternity, it is also as evident that that something must necessarily be a cogitative being; for it is as impossible that incogitative matter should produce a cogitative being, as that nothing, or the negation of all being, should produce a positive being or matter. . . .

## CHAPTER XI

## OF OUR KNOWLEDGE OF THE EXISTENCE OF OTHER THINGS

1. *It is to be had only by sensation.*—The knowledge of our own being we have by intuition. The existence of a God reason clearly makes known to us, as has been shown.

The knowledge of the existence of any other thing, we can have only by sensation: for, there being no necessary connection of real existence with any idea a man hath in his memory, nor of any other existence but that of God with the existence of any particular man, no particular man can know the existence of any other being, but only when by actual operating upon him it makes itself perceived by him. For, the having the idea of anything in our mind no more proves the existence of that thing than the picture of a man evidences his being in the world, or the visions of a dream make thereby a true history.

2. *Instance: whiteness of this paper.*—It is therefore the actual receiving of ideas from without that gives us notice of the existence of other things, and makes us know that something doth exist at that time without us which causes that idea in us, though perhaps we neither know nor consider how it does it; for it takes not from the certainty of our senses, and the ideas we receive by them, that we know not the manner wherein they are produced: v. g., whilst I write this, I have, by the paper affecting my eyes, that idea produced in my mind which whatever object causes, I call white; by which I know that that quality or accident (i. e., whose appearance before my eyes always causes that idea) doth really exist and hath a being without me. And of this the greatest assurance I can possibly have, and to which my faculties can attain, is the testimony of my eyes, which are the proper and sole judges of this thing; whose testimony I have reason to rely on as so certain that I can no more doubt, whilst I write this, that I see white and black, and that something really exists that causes that sensation in me, than that I write or move my hand; which is a certainty as great as human nature is capable of concerning the existence of anything but a man's self alone and of God.

3. *This, though not so certain as demonstration, yet may be called knowledge, and proves the existence of things without us.*—The notice we have by our senses of the existing of things without us, though it be not altogether so certain as our intuitive knowledge, or the deductions of our reason employed about the clear abstract ideas of our own minds; yet it is an assurance that deserves the name of knowledge. If we persuade ourselves that our faculties act and inform us right concerning the existence of those objects that affect them, it cannot pass for an ill-grounded confidence: for I

think nobody can, in earnest, be so skeptical as to be uncertain of the existence of those things which he sees and feels. At least, he that can doubt so far (whatever he may have with his own thoughts) will never have any controversy with me; since he can never be sure I say anything contrary to his own opinion. As to myself, I think God has given me assurance enough of the existence of things without me; since, by their different application, I can produce in myself both pleasure and pain, which is one great concernment of my present state. This is certain, the confidence that our faculties do not herein deceive us is the greatest assurance we are capable of concerning the existence of material beings. For we cannot act anything but by our faculties, nor talk of knowledge itself but by the help of those faculties which are fitted to apprehend even what knowledge is. But, besides the assurance we have from our senses themselves, that they do not err in the information they give us of the existence of things without us when they are affected by them, we are farther confirmed in this assurance by other concurrent reasons.

4. (i) *Because we cannot have them but by the inlet of the senses.*—First, it is plain those perceptions are produced in us by exterior causes affecting our senses, because those that want the organs of any sense never can have the ideas belonging to that sense produced in their minds. This is too evident to be doubted; and therefore we cannot but be assured that they come in by the organs of that sense, and no other way. The organs themselves, it is plain, do not produce them; for then the eyes of a man in the dark would produce colors, and his nose smell roses in the winter: but we see nobody gets the relish of a pineapple till he goes to the Indies where it is, and tastes it.

5. (ii) *Because an idea from actual sensation and another from memory are very distinct perceptions.*—Secondly, because sometimes I find that I cannot avoid the having those ideas produced in my mind: for though when my eyes are shut, or windows fast, I can at pleasure recall to my mind the ideas of light or the sun, which former sensations had lodged in my

memory; so I can at pleasure lay by that idea, and take into my view that of the smell of a rose, or taste of sugar. But if I turn my eyes at noon towards the sun, I cannot avoid the ideas which the light or sun then produces in me. So that there is a manifest difference between the ideas laid up in my memory (over which, if they were there only, I should have constantly the same power to dispose of them, and lay them by at pleasure), and those which force themselves upon me and I cannot avoid having. And therefore it must needs be some exterior cause, and the brisk acting of some objects without me, whose efficacy I cannot resist, that produces those ideas in my mind, whether I will or no. Besides, there is nobody who doth not perceive the difference in himself between contemplating the sun as he hath the idea of it in his memory, and actually looking upon it: of which two his perception is so distinct, that few of his ideas are more distinguishable one from another. And therefore he hath certain knowledge that they are not both memory, or the actions of his mind and fancies only within him; but that actual seeing hath a cause without.

6. (iii) *Pleasure or pain, which accompanies actual sensation, accompanies not the returning of those ideas without the external objects.*—Thirdly, add to this, that many of those ideas are produced in us with pain, which afterwards we remember without the least offence. Thus the pain of heat or cold, when the idea of it is revived in our minds, gives us no disturbance; which, when felt, was very troublesome, and is again when actually repeated; which is occasioned by the disorder the external object causes in our bodies when applied to them. And we remember the pain of hunger, thirst, or the headache, without any pain at all; which would either never disturb us, or else constantly do it as often as we thought of it, were there nothing more but ideas floating in our minds, and appearances entertaining our fancies, without the real existence of things affecting us from abroad. The same may be said of pleasure accompanying several actual sensations; and, though mathematical demonstration depends not upon

sense, yet the examining them by diagrams gives great credit to the evidence of our sight, and seems to give it a certainty approaching to that of demonstration itself. For it would be very strange that a man should allow it for an undeniable truth, that two angles of a figure which he measures by lines and angles of a diagram, should be bigger one than the other, and yet doubt of the existence of those lines and angles which, by looking on, he makes use of to measure that by.

7. (iv) *Our senses assist one another's testimony of the existence of outward things.*—Fourthly, our senses, in many cases, bear witness to the truth of each other's report concerning the existence of sensible things without us. He that sees a fire may, if he doubt whether it be anything more than a bare fancy, feel it too, and be convinced by putting his hand in it; which certainly could never be put into such exquisite pain by a bare idea or phantom, unless that the pain be a fancy too: which yet he cannot, when the burn is well, by raising the idea of it, bring upon himself again.

Thus I see, whilst I write this, I can change the appearance of the paper; and, by designing the letters, tell beforehand what new idea it shall exhibit the very next moment, by barely drawing my pen over it; which will neither appear (let me fancy as much as I will) if my hand stand still, or though I move my pen, if my eyes be shut; nor, when those characters are once made on the paper, can I choose afterwards but see them as they are—that is, have the ideas of such letters as I have made. Whence it is manifest that they are not barely the sport and play of my own imagination, when I find that the characters that were made at the pleasure of my own thoughts do not obey them; nor yet cease to be, whenever I shall fancy it, but continue to affect my senses constantly and regularly, according to the figures I made them. To which if we will add that the sight of those shall, from another man, draw such sounds as I beforehand design they shall stand for, there will be little reason left to doubt that those words I write do really exist without me, when they cause a long series of regular sounds to affect my ears, which could not be the effect of my imagination, nor could my memory retain them in that order.

8. *This certainty is as great as our condition needs.*—But yet, if after all this anyone will be so skeptical as to distrust his senses, and to affirm that all we see and hear, feel and taste, think and do, during our whole being, is but the series and deluding appearances of a long dream whereof there is no reality, and therefore will question the existence of all things or our knowledge of anything; I must desire him to consider that if all be a dream, then he doth but dream that he makes the question; and so it is not much matter that a waking man should answer him. But yet, if he pleases, he may dream that I make him this answer, that the certainty of things existing in *rerum natura,* when we have the testimony of our senses for it, is not only as great as our frame can attain to, but as our condition needs. For, our faculties being suited not to the full extent of being, nor to a perfect, clear, comprehensive knowledge of things free from all doubt and scruple, but to the preservation of us, in whom they are, and accommodated to the use of life, they serve to our purpose well enough, if they will but give us certain notice of those things which are convenient or inconvenient to us. For he that sees a candle burning, and hath experimented the force of its flame by putting his finger in it, will little doubt that this is something existing without him, which does him harm and puts him to great pain; which is assurance enough, when no man requires greater certainty to govern his actions by than what is as certain as his actions themselves. And if our dreamer pleases to try whether the glowing heat of a glass furnace be barely a wandering imagination in a drowsy man's fancy, by putting his hand into it, he may perhaps be awakened into a certainty greater than he could wish, that it is something more than bare imagination. So that this evidence is as great as we can desire, being as certain to us as our pleasure or pain, i. e., happiness or misery; beyond which we have no concernment either of knowing or being. Such an assurance of the existence of things without us, is sufficient to direct us in

the attaining the good and avoiding the evil which is caused by them, which is the important concernment we have of being made acquainted with them.

9. *But reaches no farther than actual sensation.*—In fine, then, when our senses do actually convey into our understandings any idea, we cannot but be satisfied that there doth something at that time really exist without us which doth affect our senses, and by them give notice of itself to our apprehensive faculties, and actually produce that idea which we then perceive; and we cannot so far distrust their testimony as to doubt that such collections of simple ideas as we have observed by our senses to be united together, do really exist together. But this knowledge extends as far as the present testimony of our senses, employed about particular objects that do then affect them, and no farther. For if I saw such a collection of simple ideas as is wont to be called man existing together one minute since, and am now alone, I cannot be certain that the same man exists now, since there is no necessary connection of his existence a minute since with his existence now: by a thousand ways he may cease to be, since I had the testimony of my senses for his existence. And if I cannot be certain that the man I saw last today is now in being, I can less be certain that he is so who hath been longer removed from my senses, and I have not seen since yesterday, or since the last year; and much less can I be certain of the existence of men that I never saw. And therefore, though it be highly probable that millions of men do now exist, yet, whilst I am alone writing this, I have not that certainty of it which we strictly call knowledge; though the great likelihood of it puts me past doubt, and it be reasonable for me to do several things upon the confidence that there are men (and men also of my acquaintance, with whom I have to do) now in the world: but this is but probability, not knowledge.

10. *Folly to expect demonstration in everything.*—Whereby yet we may observe how foolish and vain a thing it is for a man of a narrow knowledge, who having reason given him to judge of the different evidence and probability of things, and

to be swayed accordingly; how vain, I say, it is to expect demonstration and certainty in things not capable of it, and refuse assent to very rational propositions, and act contrary to very plain and clear truths, because they cannot be made out so evident as to surmount every the least (I will not say reason, but) pretence of doubting. He that in the ordinary affairs of life would admit of nothing but direct plain demonstration, would be sure of nothing in this world but of perishing quickly. The wholesomeness of his meat or drink would not give him reason to venture on it: and I would fain know what it is he could do upon such grounds as were capable of no doubt, no objection.

11. *Past existence is known by memory.*—As, when our senses are actually employed about any object, we do know that it does exist, so by our memory we may be assured that heretofore things that affected our senses have existed. And thus we have knowledge of the past existence of several things, whereof our senses having informed us, our memories still retain the ideas; and of this we are past all doubt so long as we remember well. But this knowledge also reaches no farther than our senses have formerly assured us. Thus, seeing water at this instant, it is an unquestionable truth to me that water doth exist; and remembering that I saw it yesterday, it will also be always true, and, as long as my memory retains it, always an undoubted proposition to me, that water did exist the 10th of July 1688, as it will also be equally true that a certain number of very fine colors did exist, which at the same time I saw upon a bubble of that water: but being now quite out of sight both of the water and bubbles too, it is no more certainly known to me that the water doth now exist than that the bubbles or colors therein do so; it being no more necessary that water should exist today because it existed yesterday, than that the colors or bubbles exist today because they existed yesterday, though it be exceedingly much more probable, because water hath been observed to continue long in existence, but bubbles and the colors on them quickly cease to be.

12. *The existence of spirits not knowable.*—What ideas we have of spirits, and how we come by them, I have already shown. But though we have those ideas in our minds, and know we have them there, the having the ideas of spirits does not make us know that any such things do exist without us, or that there are any finite spirits, or any other spiritual beings but the Eternal God. We have ground from revelation, and several other reasons, to believe with assurance that there are such creatures; but, our senses not being able to discover them, we want the means of knowing their particular existences. For we can no more know that there are finite spirits really existing by the idea we have of such beings in our minds, than by the ideas anyone has of fairies or centaurs he can come to know that things answering those ideas do really exist.

And therefore concerning the existence of finite spirits, as well as several other things, we must content ourselves with the evidence of faith; but universal certain propositions concerning this matter are beyond our reach. For, however true it may be, v. g., that all the intelligent spirits that God ever created do still exist, yet it can never make a part of our certain knowledge. These and the like propositions we may assent to as highly probable, but are not, I fear, in this state capable of knowing. We are not, then, to put others upon demonstrating, nor ourselves upon search of, universal certainty in all those matters wherein we are not capable of any other knowledge but what our senses give us in this or that particular.

13. *Particular propositions concerning existences are knowable.*—By which it appears that there are two sorts of propositions. (1) There is one sort of propositions concerning the existence of anything answerable to such an idea: as, having the idea of an elephant, phœnix, motion, or an angel in my mind, the first and natural inquiry is, whether such a thing does any where exist. And this knowledge is only of particulars. No existence of anything without us, but only of God, can certainly be known farther than our senses in-

form us. (2) There is another sort of propositions, wherein is expressed the agreement or disagreement of our abstract ideas, and their dependence one on another. Such propositions may be universal and certain. So having the idea of God and myself, of fear and obedience, I cannot but be sure that God is to be feared and obeyed by me; and this proposition will be certain concerning man in general, if I have made an abstract idea of such a species whereof I am one particular. But yet this proposition, how certain soever, that men ought to fear and obey God, proves not to me the existence of men in the world, but will be true of all such creatures whenever they do exist: which certainty of such general propositions depends on the agreement or disagreement to be discovered in those abstract ideas.

14. *And general propositions concerning abstract ideas.*—In the former case, our knowledge is the consequence of the existence of things producing ideas in our minds by our senses; in the latter, knowledge is the consequence of the ideas (be they what they will) that are in our minds, producing their general certain propositions. Many of these are called *æternæ veritates,* and all of them indeed are so; not from being written all or any of them in the minds of all men, or that they were any of them propositions in any one's mind till he, having got the abstract ideas, joined or separated them by affirmation or negation. But wheresoever we can suppose such a creature as man is, endowed with such faculties, and thereby furnished with such ideas as we have, we must conclude he must needs, when he applies his thoughts to the consideration of his ideas, know the truth of certain propositions that will arise from the agreement or disagreement which he will perceive in his own ideas. Such propositions are therefore called eternal truths, not because they are eternal propositions actually formed, and antecedent to the understanding that at any time makes them; nor because they are imprinted on the mind from any patterns that are any where of them out of the mind, and existed before; but because, being once made about abstract ideas so as to be true, they will, whenever

they can be supposed to be made again at any time past or to come, by a mind having those ideas, always actually be true. For, names being supposed to stand perpetually for the same ideas, and the same ideas having immutably the same habitudes one to another, propositions concerning any abstract ideas that are once true must needs be eternal verities. . . .

[In the next chapter, "Of the Improvement of Our Knowledge," Locke draws his practical conclusions.

Knowledge (as he has shown in Chap. VII) is not from maxims, but from the comparing of clear and distinct ideas. Therefore the true method of advancing knowledge is by considering our abstract ideas. But in "our search after the knowledge of *substances* our want of ideas that are suitable to such a way of proceeding obliges us to a quite different method. We advance not here, as in the other (where our abstract ideas are real as well as nominal essences), by contemplating our ideas, and considering their relations and correspondences. The want of ideas of their real essences sends us from our own thoughts to the things themselves as they exist. *Experience here must teach me* what reason cannot . . ." This method of experience can procure us convenience, but will not produce true science. "I deny not but a man accustomed to rational and regular experiments shall be able to see farther into the nature of bodies, and guess righter at their yet unknown properties, than one that is a stranger to them; but yet, as I have said, this is but judgment and opinion, not knowledge and certainty. This way of getting and improving our knowledge in substances only by experience and history, which is all that the weakness of our faculties in this state of mediocrity which we are in in this world can attain to, makes me suspect that natural philosophy is not capable of being made a science. We are able, I imagine, to reach very little general knowledge concerning the species of bodies and their several properties. Experiments and historical observations we may have, from which we may draw advantages of ease and health, and thereby increase our stock of conveniences for this life; but beyond this I fear our talents reach not, nor are our faculties, as I guess, able to advance.

"From whence it is obvious to conclude, that since our faculties are not fitted to penetrate into the internal fabric and real essences of bodies, but yet plainly discover to us the being of a God, and the knowledge of ourselves, enough to lead us into a full and clear discovery of our duty and great concernment; it will become us, as rational creatures, to employ those faculties we have about what they are most adapted to, and follow the direction of nature, where it seems to point us out the way. For it is rational to conclude that our proper employment lies in those enquiries, and in that sort of knowledge which is most suited to our natural capacities, and carries in it our greatest interest, i.e., the condition of our eternal estate. Hence I think I may conclude that *morality is the proper science and business of mankind in general."* Locke terminates the chapter with some brief advice on the use and abuse of hypothesis in the experimental investigation of nature.

The brief chapter XIII, "Some Further Considerations Concerning Our Knowledge," is not sufficiently important to warrant a summary.

Locke is now ready to turn to his final topic, "the grounds and degrees of belief, opinion, and assent." Chapters XIV–XX treat "Of Judgment," "Of Probability," "Of the Degrees of Assent," "Of Reason," "Of Faith and Reason, and Their Distinct Provinces," "Of Enthusiasm," and "Of Wrong Assent, or Error."

The chief practical conclusion from the precedent discussion is that our knowledge, though sufficient for our estate, extends in most things but a little way. "Therefore, as God has set some things in broad daylight; as He has given us some certain knowledge, though limited to a few things in comparison, probably, as a taste of what intellectual creatures are capable of, to excite in us a desire and endeavor after a better state: so in the greatest part of our concernment, He has afforded us only the twilight, as I may so say, of *probability,* suitable, I presume, to that state of mediocrity and probationership He has been pleased to place us in here . . . Thus the mind has two faculties conversant about truth and falsehood:

"First, *knowledge,* whereby it certainly perceives, and is undoubtedly satisfied of the agreement or disagreement of any ideas.

"Secondly, *judgment,* which is the putting ideas together, or separating them from one another in the mind, when their certain agreement or disagreement is not perceived, but *presumed* to be so; which is, as the word imports, taken to be so before it certainly appears. And if it so unites or separates them as in reality things are, it is right judgment."

'Judgment,' then, is concerned with the determination of probability. Locke now proceeds (Chap. XV) to define probable reasoning, as distinguished from demonstration: "As demonstration is the showing the agreement or disagreement of two ideas by the intervention of one or more proofs, which have a constant, immutable, and visible connection one with another; so probability is nothing but the appearance of such an agreement or disagreement by the intervention of proofs, whose connection is not constant and immutable, or at least is not perceived to be so; but is, or appears for the most part to be so, and is enough to induce the mind to judge the proposition to be true or false, rather than the contrary." He next discusses "the several degrees and grounds of probability, and assent or faith." The grounds of probability are two:

"First, the conformity of anything with our own knowledge, observation, and experience.

"Secondly, the testimony of others, vouching their observation and experience. In the testimony of others is to be considered: (1) The number. (2) The integrity. (3) The skill of the witnesses. (4) The design of the author, where it is a testimony out of a book cited. (5) The consistency of the parts and circumstances of the relation. (6) Contrary testimonies."

Locke first distinguishes (Chap. XVI) three degrees of probability which command ready assent: "The first and *highest degree of probability* is, when the general consent of all men in all ages, as far as it can be known, concurs with a man's constant and never-failing experience in like cases, to confirm the truth of any particular matter of fact attested by fair witnesses: such are all the stated constitutions and properties of bodies, and the regular proceedings of causes and effects in the ordinary course of nature. This we call an argument from the nature of things themselves. For what our own and other men's constant observations has found always to be after the same manner, that we with reason conclude to be the effects of steady and regular causes, though they come not within the reach of our knowledge. These *probabilities* rise so near to *certainty,* that they govern our thoughts as absolutely, and influence all our actions as fully, as the most evident demonstration; and in what concerns us, we make little or no difference between them and certain knowledge. Our belief thus grounded rises to *assurance.*

"Secondly, the next degree of probability is, when I find by my own experience, and the agreement of all others that mention it, a thing to be for the most part so, and that the particular instance of it is attested by many and undoubted witnesses: v. g., history giving us such an account of men in all ages, and my own experience, as far as I had an opportunity to observe, confirming it, that most men prefer their private advantage to the public. If all historians that write of Tiberius say that Tiberius did so, it is extremely probable. And in this case, our assent has a sufficient foundation to raise itself to a degree which we may call *confidence.*

"Thirdly, in things that happen indifferently, as that a bird should fly this or that way; that it should thunder on a man's right or left hand, etc., when any particular matter of fact is vouched by the concurrent testimony of unsuspected witnesses, there our assent is also unavoidable."

"Thus far," he adds, "the matter goes easy enough. Probability upon such grounds carries so much evidence with it, that it naturally determines the judgment, and leaves us as little liberty to believe or disbelieve, as a demonstration does whether we will know or be ignorant. The difficulty is when testimonies contradict common experience, and the reports of history and witnesses clash with the ordinary course of nature, or with one another. This only may be said in general, that as the arguments and proofs, *pro* and *con,* upon due examination, nicely weighing every particular circumstance, shall to anyone appear upon the whole matter, in a greater or less degree, to preponderate on either side; so they are fitted to produce in the mind such different entertainment as we call *belief, conjecture, guess, doubt, wavering, distrust, disbelief,* etc." The basic rule to be observed here is that the farther any testimony be removed from its original source the less force and proof it has. "So that, in traditional truths, each remove weakens the force of the proof." Nothing is more false than the common view that opinions "gain force by growing older." On such grounds "propositions, evidently false or doubtful enough in their first beginning, come, by an inverted rule of probability, to pass for authentic truths." But in fact, "no probability can arise higher than its first original."

There is however "one case wherein the strangeness of the fact lessens not the assent to a fair testimony given of it . . . This is the proper case of *miracles,* which, well attested, do not only find credit themselves, but give it also to other truths which need such confirmation." And there is "one sort of propositions that challenge the highest degree of our assent, upon bare testimony, whether the thing proposed agree or disagree with common experience and the ordinary course of things or no. The reason whereof is, because the testimony is of such an one as cannot deceive nor be deceived, and that is of God Himself. This carries with it assurance beyond doubt, evidence beyond exception. This is called by a peculiar name *revelation,* and our assent to it, *faith;* which as absolutely determines our minds and as perfectly excludes all wavering, as our knowledge itself; and we may as well doubt of our own being, as we can whether any revelation from God be true. So that faith is a settled and sure principle of assent and assurance, and leaves no manner of room for doubt or hesitation. Only we must be sure that it be a divine revelation, and that we understand it right: else we shall expose ourselves to all the extravagancy of enthusiasm, and all the error of wrong principles, if we have faith and assurance in what is not divine revelation. And therefore in those cases, our assent can be rationally no higher than the evidence of its being a revelation, and that this is the meaning of the expressions it is delivered in. If the evidence of its being a revelation, or that this is its true sense, be only on probable proofs, our assent can reach no higher than an assurance or diffidence, arising from the more or less apparent probability of the proofs. But of faith, and the precedency it ought to have before other arguments of persuasion, I shall speak more hereafter, where I treat of it as it is ordinarily placed, in contradistinction to reason; though, in truth, it be nothing else but an assent founded on the highest reason."

In the next two chapters (XVII–XVIII) Locke develops this view of the relation of faith to reason. It is the function of reason both to enlarge our knowledge and regulate our assent. "Sense and intuition reach but a very little way. The greatest part of our knowledge depends upon deductions and intermediate ideas; and in those cases where we are fain to substitute assent instead of knowledge, and take propositions for true without being certain they are so, we have need to find out, examine, and compare the grounds of their probability. In both these cases the faculty which finds out the means, and rightly applies them to discover certainty in the one, and probability in the other, is that which we call reason."

Here Locke digresses (§ 4–8) into a criticism of the view that the syllogism is the natural mode of reasoning. This attack on the syllogism is part of the negative argument against 'innate ideas' and 'received maxims' which keeps recurring throughout the *Essay*. His principal point is that this "way of reasoning discovers no new proofs, but is the art of marshalling and ranging old ones we have already . . . A man knows first, and then he is able to prove syllogistically. So that syllogism comes after knowledge, and then a man has little or no need of it." Locke also notices "one manifest mistake in the rules of syllogism: viz., that no syllogistical reasoning can be right or conclusive but what has at least one *general* proposition in it. As if we could not reason, and have knowledge about particulars: whereas, in truth, the matter rightly considered, the immediate object of all our reasoning and knowledge, is nothing but particulars. Every man's reasoning and knowledge is only about the ideas existing in his own mind; which are truly, every one of them, particular existences: and our knowledge and reason about other things is only as they correspond with those our particular ideas. So that the perception of the agreement or disagreement of our particular ideas, is the whole and utmost of all our knowledge. Universality is but accidental to it, and consists only in this, that the particular ideas about which it is are such as more than one particular thing can correspond with and be represented by. But the perception of the agreement or disagreement of [any two ideas], and consequently our knowledge, is equally clear and certain, whether either, or both, or neither of those ideas, be capable of representing more real beings than one, or no."

Locke now returns to the original question: "By what has been before said of reason, we may be able to make some guess at the distinction of things, into those that are according to, above, and contrary to reason. (1) *According to reason* are such propositions whose truth we can discover by examining and tracing those ideas we have from sensation and reflection, and by natural deduction find to be true or probable. (2) *Above reason* are such propositions whose truth or probability we cannot by reason derive from those principles. (3) *Contrary to reason* are such propositions as are inconsistent with or irreconcilable to our clear and distinct ideas. Thus the existence of one God is according to reason; the existence of more than one God is contrary to reason; the resurrection of the dead above reason." Reason, in the proper sense of that term, cannot, then, be opposed to faith, for "faith is nothing but a firm assent of the mind; which if it be regulated, as is our duty, cannot be afforded to anything but upon good reason, and so cannot be opposite to it. He that believes, without having any reason for believing, may be in love with his own fancies; but neither seeks truth as he ought, nor pays the obedience due to his Maker, who would have him use those discerning faculties He has given him, to keep him out of mistake and error." Though revelation "where God has been pleased to give it, *must carry it against the probable conjectures of reason,*" yet "it still belongs to reason to judge of the truth of its being a revelation, and of the signification of the words wherein it is delivered . . . And therefore *nothing that is contrary to, and inconsistent with, the clear and self-evident dictates of reason, has a right to be urged or assented to, as a matter of faith, wherein reason hath nothing to do.*"

In Chap. XIX, "Of Enthusiasm," added in the fourth edition, Locke reverts again to the negative side of his argument. He proposes in this chapter "to consider a third ground of assent, which, with some men, has the same authority, and is as confidently relied on, as either faith or reason: I mean *enthusiasm,* which, laying by reason, would set up revelation without it. Whereby in effect it takes away both reason and revelation, and substitutes in the room of it the ungrounded fancies of a man's own brain, and assumes them for a foundation both of opinion and conduct. *Reason* is natural *revelation,* whereby the eternal Father of light, and Fountain of all knowledge, communicates to mankind that portion of truth which He has laid within the reach of their natural faculties. *Revelation* is natural *reason* enlarged by a new set of discoveries communicated by God immediately, which reason vouches the truth of, by the testimony and proofs it gives that they come from God. So that he that takes away reason to make way for revelation, puts out the light of both; and does much-what the same as if he would persuade a man to put out his eyes, the better to receive the remote light of an invisible star by a telescope."

Finally (Chap. XX) Locke discusses the causes of wrong assent, or error. These he reduces to four: "(1) *Want of proofs.* (2) *Want of ability to use them.* (3) *Want of will to use them.* (4) *Wrong measures of probability.*"

The *Essay* closes with a brief chapter, "Of the Division of the Sciences." Locke makes three basic divisions in our knowledge: Physics, Ethics, and Logic. "This seems to me the first and most general, as well as natural division of the objects of our understanding. For a man can employ his thoughts about nothing but, either the contemplation of things themselves, for the discovery of truth; or about the things in his own power, which are his own actions, for the attainment of his own ends; or the signs the mind makes use of, both in the one and the other, and the right ordering of them for its clearer information. All which three—viz., *things,* as they are in themselves knowable; *actions,* as they depend on us in order to happiness; and the right use of *signs* in order to knowledge—being *toto caelo* different, they seemed to me to be the three great provinces of the intellectual world, wholly separate and distinct one from another."]

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